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Proceedings of the American Academy of Arts and Sciences.

VOL. 68. No. 13.—DECEMBER, 1933.

RECORDS OF MEETINGS, 1932-1933.

OFFICERS AND COMMITTEES FOR 1933-1934.

LIST OF THE FELLOWS AND FOREIGN HONORARY
MEMBERS.

STATUTES AND STANDING VOTES.

RUMFORD PREMIUM.

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- 1 BRIDGMAN, P. W.—The Pressure-Volume-Temperature Relations of Fifteen Liquids. pp. 1-25. March, 1933. \$0.60.
- 2 BRIDGMAN, P. W.—Compressibilities and Pressure Coefficients of Resistance of Elements, Compounds, and Alloys, Many of Them Anomalous. pp 27-93. March, 1933. \$1.20.
- 3 BRIDGMAN, P. W.—The Effect of Pressure on the Electrical Resistance of Single Metal Crystals at Low Temperature. pp. 95-123. March, 1933. \$0.75.
- 4 URRY, WM. D.—Radioactivity Measurements. I The Radium Content of the Keweenaw Basalts and Some Accessory Minerals. II. The Occurrence of Radium, Uranium and Potassium in the Earth pp. 125-144. March, 1933. \$0.50.
- 5 SMITH, LYMAN B.—1 Studies in the *Bromeliaceae*.—IV. pp. 145-151. W. E. BROADWAY AND L. B. SMITH.—2. The *Bromeliaceae* of Trinidad and Tobago. pp 152-188. April, 1933. \$0.90.
- 6 HEIDEL, W. A.—A Suggestion Concerning Plato's Atlantis pp. 189-228. May, 1933. \$0.85.
- 7 BARNETT, S. J.—Gyromagnetic Experiments on the Process of Magnetization in Weak Fields. pp. 229-249. June, 1933. \$0.65.
- 8 LEWIS, FREDERIC T.—The Significance of Cells as Revealed by their Polyhedral Shapes, with special Reference to Precartilage, and a Surmise Concerning Nerve Cells and Neuroglia. pp. 251-286. June, 1933. \$0.85.
- 9 WILSON, EDWIN B. AND PUFFER, RUTH R.—Least Squares and Laws of Population Growth pp. 285-382. August, 1933. \$1.75.
- 10 CADY, W. G.—The Application of Methods of Geometrical Inversion to the Solution of Certain Problems in Electrical Resonance. pp. 383-409. September, 1933. \$0.60.
- 11 CARPENTER, FRANK M.—The Lower Permian Insects of Kansas. Part 6. pp 411-503. October, 1933. \$1.45.
- 12 KEYES, FREDERICK G.—Methods and Procedures used in the Massachusetts Institute of Technology Program of Investigation of the Pressures and Volumes of Water to 460° C. pp 505-564. November, 1933. \$1.20.
- 13 RECORDS OF MEETINGS: Biographical Notices: Officers and Committees: List of Fellows and Foreign Honorary Members: Statutes and Standing Votes, etc. pp. 565-755. December, 1933. \$2.00.



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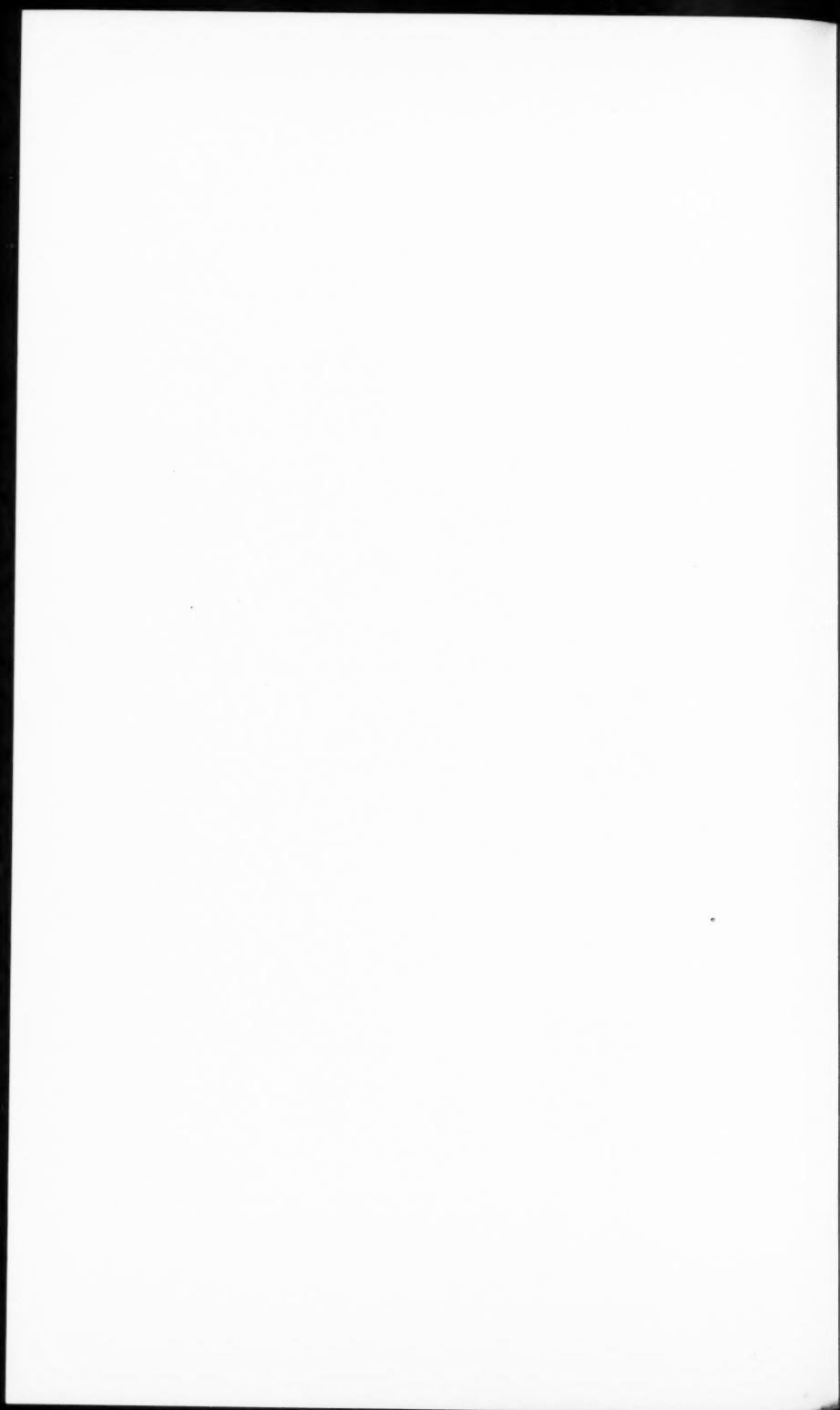
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RECORDS OF MEETINGS.

One thousand one hundred and ninety ninth meeting.

OCTOBER 19, 1932.—STATED MEETING.

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present seventy-five Fellows and eight guests.

The records of the meeting of May 11 were read and approved.

The Corresponding Secretary reported the receipt of letters accepting Fellowship from C. R. Adams, M. J. Ahern, J. R. Angell, J. C. Aub, C. F. Batchelder, A. A. Bennett, Welles Bosworth, W. B. Cabot, Leonard Carmichael, W. R. Castle, Jr., G. C. Cell, J. P. Chamberlain, C. D. Clifton, J. C. Cobb, K. J. Conant, J. A. Cousens, R. S. Crane, M. W. Croll, W. J. Cunningham, E. C. Cutler, H. S. Dennison, A. S. Dewing, W. B. Donham, G. H. Edgell, Felix Frankfurter, Glennon Gilboy, J. C. Grew, Albert Haertlein, W. P. Hall, William Healy, Einar Hille, H. W. Holmes, E. R. James, William James, P. C. Jessup, Hayward Keniston, T. W. Lamont, E. F. Langley, K. S. Lashley, R. R. Lawrence, W. G. Leland, J. A. Lowell, F. B. Lund, W. W. McLaren, Sayre Macneil, Calvert Magruder, K. L. Mark, L. C. Marshall, C. E. Merriam, F. C. Mills, O. L. Mills, Everett Morss, H. G. Moulton, A. D. Nock, G. R. Noyes, William Cardinal O'Connell, W. F. Ogburn, Milman Parry, A. S. Pease, A. J. Peters, David Rapport, A. L. Ripley, G. B. Roorbach, L. S. Rowe, F. B. Sayre, W. C. Schumb, H. R. Shepley, H. E. Smith, Payson Smith, Carl Snyder, C. Henry Taylor, C. Holt Taylor, William Thomson, E. S. Thurston, E. S. Webster, R. H. Wetmore, D. V. Widder, J. H. Williams, W. F. Willoughby, B. L. Young; and of letters accepting Foreign Honorary Membership from Mineichiro Adatci, F. Orpen Bower, A. L. Bowley, R. G. Hawtrey, Hu Shih, Paul Mazon, Kingo Miyabe, Charles Rist, A. C. Seward, F. W. Thomas.

He also announced that Dr. Herbert J. Spinden had represented the Academy at the inauguration of William A. Boylan as President of Brooklyn College, on June 21, 1932; and that the President of the

Academy would act as its delegate at the conference on the "Obligation of Universities to the Social Order," at New York University, November 15-17, 1932.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To George F. Beck, Washington State Normal School, Ellensburg, \$200, for the purchase of apparatus and for field expenses and assistance in prosecuting his investigations in paleobotany.

2. To Willi M. Cohn, Cambridge, \$300, to aid him to go to the Pacific coast, where he can obtain the use of a Hartmann microphotometer for the purpose of evaluating the records made at the recent solar eclipse on the polarization of the solar corona.

3. To Gleason F. Kenrick, Tufts College, \$300, for the purchase of oscillographic equipment for use in his investigations of the Kennelly-Heaviside layer.

4. To Bret Ratner, New York University, \$800, to aid in the support of his investigations on anaphylactogenic properties of split proteins and amino acids of milk, etc.

5. To John F. Sly, West Virginia University, Morgantown, \$500, to aid in his investigations of town and county expenditures in England.

The President announced the death of ten Fellows:—Nathaniel Allison (Class II, Section 4), John Ripley Freeman (Class I, Section 4), Elijah Clarence Hills (Class IV, Section 3), Edward Washburn Hopkins (Class IV, Section 3), William White Jacques (Class I, Section 2), Charles Willison Johnson (Class II, Section 3), William Williams Keen (Class II, Section 4), Oliver Dimon Kellogg (Class I, Section 1), George Augustus Sanderson (Class III, Section 1), Edward Wyllys Taylor (Class II, Section 4); and of one Foreign Honorary Member:—Jean Adrien Antoine Jules Jusserand (Class III, Section 2).

The following communications were presented:

Mr. Joshua Whatmough: "Prunae Vatillum (Hor. Sat. i. 5. 36)."

Motion Pictures of Harvard Botanical Garden in Cuba and of the Barro Colorado Island Laboratory in the Panama Canal Zone, with Special Reference to the Wild Life. Incidental Remarks by Mr. William H. Weston, Jr.

Three papers were presented by title: "The Saltatorial Rodent Dipodomys. The Functional and Comparative Anatomy of its

Muscular and Osseous Systems, by A. Brazier Howell, presented by H. V. Neal; "The Compressibility of Eighteen Cubic Compounds," by P. W. Bridgman; "The Pressure Coefficient of Resistance of Fifteen Metals down to Liquid Oxygen Temperatures," by P. W. Bridgman.

The meeting was dissolved at 10.10 P. M.

One thousand two hundredth meeting.

NOVEMBER 9, 1932.—STATED MEETING.

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present forty-two Fellows and fifty-two guests chiefly members of the American Statistical Association, who had been invited to attend by the President.

The records of the meeting of October 19 were read and approved.

The Corresponding Secretary reported the receipt of a letter from Frederick K. Morris, accepting his election as a Fellow.

The President announced the death of two Fellows:—William Patten (Class II, Section 3) and William Lambert Richardson (Class II, Section 4).

The following communication was presented:

Mr. Carl Snyder: "Recent Progress in Monetary Theory."

Two papers were read by title: "Note on Stellar Perturbations of nearly Parabolic Orbits," by Ernst J. Öpik, presented by Harlow Shapley; "The Eclipsing Binaries RW Arae and SW Ophiuchi," by Martha B. Shapley, presented by Harlow Shapley.

The meeting was dissolved at 10.20 P. M.

One thousand two hundred and first meeting.

DECEMBER 14, 1932.—STATED MEETING.

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present fifty-two Fellows and fifteen guests.

The records of the meeting of November 9 were read and approved.

The Corresponding Secretary reported the receipt of letters from Paul Claudel and Pierre Janet accepting Foreign Honorary Membership; and from B. P. Clark, Howard Coonley, C. K. Drinker, E. S. Drown, E. C. Jeffrey, and R. C. Sturgis, resigning Fellowship.

He also announced that the President had appointed Wallace W. Atwood as delegate of the Academy at the First Congress of the Pan American Institute of Geography and History, to be held at Rio de Janeiro, beginning December 26, 1932.

The President announced the death of two Fellows:—William Sydney Thayer (Class II, Section 4) and Henry Pickering Walcott (Class II, Section 4).

The following communication was presented:

Mr. James B. Conant: "The Structure of Chlorophyll and the Problem of Photosynthesis."

The following papers were read by title: "Compressibilities and Pressure Coefficients of Resistance of Elements, Compounds, and Alloys, Many of them Anomalous," by P. W. Bridgman; "The Effect of Pressure on the Electrical Resistance of Single Metal Crystals at Low Temperatures," by P. W. Bridgman; "The Volume-Pressure-Temperature Relations of Fifteen Liquids," by P. W. Bridgman; "Radioactivity Measurements. 1. The Radium Content of the Keweenaw Basalts and Some Accessory Minerals. 2. The Occurrence of Radium, Uranium, and Potassium in the Earth," by William D. Urry, presented by A. C. Lane.

The meeting was dissolved at 9.20 P. M.

One thousand two hundred and second meeting.

JANUARY 11, 1933.—STATED MEETING.

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present sixty-four Fellows and three guests.

In the absence of the Recording Secretary, Vice-President Gulick was asked to assume his duties.

The records of the meeting of December 14 were read and approved.

The Corresponding Secretary reported that Mr. Edwin B. Wilson had represented the Academy at the conference on the obligation of

universities to the social order, held at New York University, November 15-17, 1932.

He also reported that the Council had reclassified Foreign Honorary Member Wolfgang Köhler in Class IV, Section 1, instead of Class II, Section 3, as formerly.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To P. W. Bridgman, Harvard, \$200, to be applied as part salary of an assistant in his researches on the effects of high pressures.

2. To C. F. Brooks, Blue Hill Observatory, \$75, for designing, constructing, and standardizing a cup anemometer having the heating element enclosed, for use on Mt. Washington.

3. To L. R. Cleveland, Harvard, \$750, for assistance, apparatus, and materials in the prosecution of his anatomical and cytological researches on the protozoa of the wood feeding roaches, *Cryptocercus punctulatus*.

4. To W. C. Rose, University of Illinois, \$250, to be used in part payment of the salary of his assistant in an investigation seeking to isolate a hitherto unknown component of casein essential for life, and related problems of nutritional chemistry.

The President announced the death of three Fellows:—John Joseph Carty (Class I, Section 4), Eliakim Hastings Moore (Class I, Section 1), and James Hardy Ropes (Class IV, Section 1).

Dr. Elihu Thomson then told of his personal observations of the great Leonid Meteor Shower of November 14, 1867, in Philadelphia. He also read a thrilling description of the experiences of Mr. Van Gestel at Anjer, Java, which town was overwhelmed at the great explosion of the volcano Krakatoa in the Sunda Straits in August 1883.

The following papers were read by title:

“The Purification and Physical Properties of Organic Compounds.

1. The Interpretation of Time-Temperature Curves in Freezing Point Determinations and as a Criterion of Purity,” by Evald L. Skau, presented by F. G. Keyes.

“Studies in the *Bromeliaceæ*. IV,” by L. B. Smith; and “The *Bromeliaceæ* of Trinidad,” by W. E. Broadway and L. B. Smith, presented by B. L. Robinson.

The meeting was dissolved at 9.30 P. M.

One thousand two hundred and third meeting.

FEBRUARY 8, 1933.—STATED MEETING.

The Academy met at its House at 8.35 P. M.

The PRESIDENT in the Chair.

There were present forty-one Fellows.

The records of the meeting of January 11 were read and approved.

The Corresponding Secretary reported the receipt of a letter from Dr. James H. Means, resigning Fellowship.

The President announced the death of two Foreign Honorary Members: John Galsworthy (Class IV, Section 4) and Sir Robert Jones (Class II, Section 4).

The following communication was presented:

Mr. Arthur E. Kennelly: "Approximate Laws of Fatigue in Racing Animals, as Deduced from World's Racing Records," illustrated by lantern slides.

The meeting was dissolved at 9.55 P. M.

One thousand two hundred and fourth meeting.

MARCH 8, 1933.—STATED MEETING.

The Academy met at its House at 8.40 P. M.

The PRESIDENT in the Chair.

There were present twenty-eight Fellows and seven guests.

The records of the meeting of February 8 were read and approved.

The Corresponding Secretary announced that Professor Charles A. Kofoed had been appointed the delegate of the Academy at the Fifth Pacific Science Congress to be held in Victoria and Vancouver, B. C. in June 1933.

On the recommendation of the Council the following appropriations were made for the ensuing year:

From the income of the General Fund, \$7,725, to be used as follows:

for General and Meeting expenses	\$ 800
for Library expenses	2,000
for Books, Periodicals, and Binding	1,400
for House expenses	2,500
for Treasurer's expenses	1,025
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	\$7,725

From the income of the Publication Funds, \$2,223, to be used for publication.

From the income of the Rumford Fund, \$3,230, to be used as follows:

for Research	\$2,000
for Books, Periodicals, and Binding	350
for use at the discretion of the Committee	880
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	\$3,230

From the income of the C. M. Warren Fund, \$959.45, to be used at the discretion of the Committee.

On the recommendation of the Council an additional appropriation of \$75 from the income of the General Fund for the current year was voted for the use of the Treasurer.

The President announced the appointment of the Nominating Committee:

Frederick A. Saunders, of Class I
 Charles T. Brues, of Class II
 Arthur N. Holcombe, of Class III
 Irving Babbitt, of Class IV

Mr. Alfred C. Lane proposed an amendment to Article 7 of Chapter X of the Statutes, changing the word "prepare" to "provide."

He also proposed the appointment of a standing committee to provide biographical notices of deceased members, to consist of six members.

It was

Voted, To refer both matters to a committee consisting of Mr. Lane and both Secretaries, for report to the Academy.

The Corresponding Secretary read a short statement concerning Joseph Priestley.

The following communication was presented:

Mr. Hervey W. Shimer: "The Problem of the Changes in the Forms of Life from the Mesozoic to the Cenozoic Era."

The meeting was dissolved at 9.45 P. M.

One thousand two hundred and fifth meeting.

APRIL 12, 1933.—STATED MEETING.

The Academy met at its House at 8.35 P. M.

The PRESIDENT in the Chair.

There were present twenty-eight Fellows and six guests.

The records of the meeting of March 8 were read and approved.

The Corresponding Secretary announced the appointment of Mr. Arthur E. Kennelly as delegate of the Academy at the dedication of the George Eastman Research Laboratories of the Massachusetts Institute of Technology on May first.

He also reported the receipt of a letter from Mr. Thomas Reed Powell resigning Fellowship.

The President announced the death of two Fellows:—Arthur Messinger Comey (Class I, Section 3), Arthur Bliss Seymour (Class II, Section 2); and of one Foreign Honorary Member, William Cawthorne Unwin (Class I, Section 4).

The President reported that he had attended the dinner given by the Massachusetts Institute of Technology in honor of Dr. Elihu Thomson and had presented to him a testimonial from the Academy.

On the recommendation of the Committee appointed at the March meeting, it was voted to amend the Statutes as follows:

Add to Chapter XI, Article 2 a new section, ix, as follows: "The Committee on Biographical Notices to consist of six Fellows, two to be elected each year, six in 1933, one of them to be a Secretary of the Academy, to see that biographical notices of the Fellows are provided."

Second, to change Article 7 of Chapter X by replacing the word "it" with the words "the Committee on Biographical Notices" and to change the word "prepare" to "provide."

It was also voted to further amend the Statutes by striking out the words "which may be needed to complete their sets, but" in Chapter XI, Article 2, Section iv, paragraph 2.

The following communication was presented: Mr. Reuel W. Beach: "The Beginnings of Printing in the Americas."

The following paper was read by title: "Least Squares and Laws of Population Growth," by Edwin B. Wilson and Ruth R. Puffer.

The meeting was dissolved at 10.10 P. M.

One thousand two hundred and sixth meeting.

MAY 10, 1933.—ANNUAL MEETING.

The Academy met at its House at 8.25 P. M.

The PRESIDENT in the Chair.

There were present forty-three Fellows and six guests.

The records of the meeting of April 12 were read and approved.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To Prof. Howard H. Beard, Louisiana State University Medical Center, New Orleans, \$400, to aid in carrying on his studies in nutritional anemia of the rat.

2. To Dr. L. R. Cleveland, Harvard Medical School, \$500 in the year 1933 and \$500 in the year 1934, to aid in the publication of a monograph on the morphology of certain cockroaches and their parasites.

3. To Dr. Charles V. Green, Research Associate, Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine, \$400, for the purpose of aiding an investigation into the inheritance of the susceptibility to spontaneous mammary tumors in a mouse interspecific cross.

4. To Prof. Hudson Hoagland, Clark University, Worcester, \$475, to aid in providing him with an amplifier, photographic supplies, tubes, batteries, etc., these being certain necessary pieces of equipment for a quantitative analysis of the frequencies of nerve impulses from spontaneously discharging neuromasts in fishes, which will show the receptive function of these cells.

5. To Dr. R. J. Van de Graaff, Research Associate, Dept. of Physics, Massachusetts Institute of Technology, \$500, for the purpose of aiding in the construction of a new source of X-rays for treating cancer and other diseases.

The President reported the death of three Fellows:—Eugene Watson Burlingame (Class IV, Section 3), William Henry Holmes (Class IV, Section 4) and George Herbert Palmer (Class IV, Section 1).

He also made remarks on the recent expansion of the Academy to eight hundred Fellows and suggested that some of the meetings might

be held on the third floor. He expressed the hope that money might be found for increased publications in the humanities.

The following report of the Council was presented:

REPORT OF THE COUNCIL.

Since the last report of the Council there have been reported the deaths of twenty-two Fellows:—Nathaniel Allison, Eugene Watson Burlingame, John Joseph Carty, Arthur Messinger Comey, John Ripley Freeman, Elijah Clarence Hills, William Henry Holmes, Edward Washburn Hopkins, William White Jacques, Charles Willison Johnson, William Williams Keen, Oliver Dimon Kellogg, Eliakim Hastings Moore, George Herbert Palmer, William Patten, William Lambert Richardson, James Hardy Ropes, George Augustus Sander-son, Arthur Bliss Seymour, Edward Wyllys Taylor, William Sydney Thayer, Henry Pickering Walcott; and four Foreign Honorary Mem-bers:—John Galsworthy, Sir Robert Jones, Jean Adrien Jules Jusser- and, William Cawthorne Unwin.

Ninety-nine Fellows and thirteen Foreign Honorary Members were elected by the Council and announced to the Academy in May 1932.

The roll now includes 675 Fellows and 105 Foreign Honorary Mem-bers (not including those elected in May 1933).

The annual report of the Treasurer, Ingersoll Bowditch, was read, of which the following is an abstract:

GENERAL FUND.

Receipts.

Income on hand April 1, 1932	\$ 1,838.66		
From Investments	\$2,802.90		
From Assessments	5,640.00		
From Admissions.	420.00		
From Interest on Deposits	139.35		
From Rumford Fund Income . . .	200.00	9,202.25	\$11,040.91
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Expenditures.

Expenses of Library	\$2,024.00		
Treasurer's Expenses	1,152.05		
Books and Binding	1,460.14		
General Expenses	856.26		
House Expenses	2,693.78		
President's Expenses	45.00		
Interest on Bonds bought	165.01	\$ 8,396.24	
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Income transferred to Principal	364.75	\$ 8,760.99	

RUMFORD FUND.

Receipts.

Income on hand April 1, 1932	\$ 1,221.28		
From Investments	3,737.65	\$ 4,958.93	

Expenditures.

Purchase and Binding of Books . . \$	404.14		
Research	2,450.00		
Transferred to General Fund In- come for care of books	200.00		
Discretion of Committee—bal. 1931 transferred to Capital.	129.17	\$ 3,183.31	
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Interest on Bonds bought	12.44		
Income transferred to Principal . .	194.53	206.97	\$ 3,390.28

PUBLICATION ACCOUNT.

Receipts.

Income on hand April 1, 1932	\$11,343.34		
From Income Appleton Fund . . \$	855.49		
From Income Centennial Fund . .	2,122.74		
From Authors' Reprints.	66.50		
From Sale of Publications	436.99	3,481.72	\$14,825.06

Expenditures.

Publications	\$6,090.22		
Vault Rent—part	10.00	\$ 6,100.22	
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Interest on Bonds bought	— .11		
Income transferred to Principal	172.75	172.86	\$ 6,273.08

C. M. WARREN FUND.

Receipts.

Income on hand April 1, 1932	\$ 960.80		
From Investments	1,141.12	\$ 2,101.92	

Expenditures.

Research	\$2,060.00		
Vault Rent—part	3.00	\$2,063.00	
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Income transferred to Principal.	61.00	\$ 2,124.00	

FRANCIS AMORY FUND.

Receipts.

From Investments	\$ 2,433.00		
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Expenditures.

Publishing Statement.	\$ 55.50		
Income transferred to Principal.	1,676.00		
Interest on Bonds bought	62.22	\$ 1,793.72	

PERMANENT SCIENCE FUND.

Receipts.

Received for above fund.	\$ 5,557.25		
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Expenditures.

Grants from above fund.	\$ 5,725.00		
Application blanks for grants	57.25	\$ 5,782.25	

The following reports were also presented:

REPORT OF THE LIBRARY COMMITTEE.

During the year 184 volumes and thirty-six unbound numbers of periodicals have been borrowed by 20 different Fellows and 21 different libraries, and many more have been consulted at the Academy. All books taken out have been returned or satisfactorily accounted for. It may be of interest to note that while the number of Fellows borrowing books has not greatly increased in the past ten years, the number of libraries has quadrupled.

The number of volumes on the shelves at the time of the last report was 43,029. During the year 488 volumes were added, largely by binding serials, making the number now 43,517. This includes 65 purchased from the General Fund, 30 from the Rumford Fund, and 392 received by gift or exchange. The number of pamphlets added was 76. Several publications of the American Institute of Physics have been added to the periodical subscription list:—Physics, Journal of Chemical Physics, Journal of the Acoustical Society of America, and Journal of the Optical Society of America. The Academy had previously been receiving their other publications:—Physical Review, Review of Physical Instruments, and Reviews of Modern Physics, which it will continue.

At a recent meeting of the Library Committee the question of the number of copies of the Academy's Proceedings and Memoirs which should be kept in reserve was discussed, and it was decided that no copies of any volume or number should be distributed when the number of copies in stock has been reduced to one hundred, without consulting the Library Committee, and that no copies should be sent out when the number is below fifty, without consulting the Council.

On making a survey of the present stock of the publications, it was found that some volumes and numbers are entirely exhausted, while in other cases the number of copies is much below one hundred.

Volumes 1 through 31 of the Proceedings were issued not in separate numbers as at present, but in whole or half volumes. Of these there is a reasonably liberal supply of volumes 1 through 26, and 28, but volumes 27, 29, 30, and 31 are entirely out of print.

Of the more recent volumes which were issued in separate numbers, the supply of the numbers in volumes 32 through 47 (with a few

exceptions) is decidedly small, while some are exhausted. Beginning with volume 48 and continuing to date, the stock is adequate, with a few exceptions noted below:

Vol. 48, no. 2
 " 57, " 7
 " 60, " 14
 " 61, " 3, 4, 5, 12
 " 62, " 2, 3, 9

With some exceptions the stock of the Memoirs is fair, though of some of the earlier volumes there are less than a hundred copies. Of volume 3 of the Old Series, published in 1809, there are only a few copies, while the numbers of volumes 12 and 13 of the New Series are in some cases completely, in others almost wholly, exhausted.

If any Fellows have copies of back numbers of the Memoirs or Proceedings for which they have no use, especially of volumes 32-47, 1896-1912, the Committee would greatly appreciate it, if these copies could be returned to the Academy to add to the stock.

Mrs. Ball, who is the real librarian, has kept everything in order, has done everything desired and has been most obliging and efficient.

The following appropriations were placed at the disposal of the Librarian during the past year:

Balance from General Fund.	\$ 390.09
Balance from Rumford Fund	135.61
Appropriation from General Fund	3,400.00
Appropriation from Rumford Fund.	350.00
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Total.	\$4,275.70

The expenses charged to the library during the financial year ending March 31, 1933, were:

Salaries	\$2,000.00
Binding:	
General Fund	\$ 719.75
Rumford Fund.	92.40
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	\$ 812.15

Purchase of Books and Periodicals:

General Fund	\$ 740.39
Rumford Fund.	311.74
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	\$1,052.13

Miscellaneous.	24.00
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Total.	\$3,888.28
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There remained an unexpended balance of \$387.42, as follows:

General Fund	\$ 305.95
Rumford Fund.	81.47
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Total.	\$ 387.42
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As usual this balance will be carried over to next year.

Respectfully submitted,

ALFRED C. LANE, *Librarian.*

May 10, 1933.

REPORT OF THE RUMFORD COMMITTEE.

The Rumford Committee held six meetings during the Academic year April 1, 1932-March 31, 1933, on April 13, May 19, Oct. 9, Nov. 14, Feb. 1, and March 8.

The Committee made the following grants, during the year, from the Rumford Fund, in aid of researches in light and heat.

<i>1932</i>		<i>Amount</i>
May 11.	No. 298. Prof. Kenrick, Tufts College, for equipment in research on the Effect of Solar Radiation on the Kennelly-Heaviside Layer	\$ 400
May 27.	No. 299. Dr. Willi Cohn, c/o A. Little & Co., Cambridge, for equipment in a research on the Polarisation of Light from the Solar Corona . .	250
Oct. 19.	No. 300. Dr. Cecilia Payne, Harvard Observatory, for equipment in research in Stellar Photometry and Colorimetry.. . . .	200

1932	<i>Amount</i>
Oct. 19. No. 301. Prof. R. H. Frazier, Mass. Institute of Technology, for equipment in researches on the Thermal Properties of Metals.	100
Dec. 14. No. 302. Prof. D. C. Stockbarger, Mass. Institute of Technology, for equipment in research on the Production of Artificial Crystals in Optical Apparatus	500
Dec. 14. No. 303. Prof. A. C. Hardy, Mass. Institute of Technology, for equipment in Colorimetric Research.	500
Dec. 14. No. 304. Prof. J. R. Roebuck, University of Wisconsin, for equipment in Joule-Thomson Measurements	100
Total	\$2,050

The Committee has voted twice unanimously, and recommended the award of the Rumford Medal by the Academy, at the meeting of May 10, 1933, to Prof. Harlow Shapley, Director of the Harvard Observatory, "for Researches on the Luminosity of Stars and Galaxies." The Committee also recommends that this medal be delivered to Prof. Shapley at a special Boston or Cambridge meeting, next December, to be arranged in association with the American Association for the Advancement of Science, and provisionally assigned to Wednesday, December 27, 1933.

Reports of progress in researches aided by Rumford grants have been recently received from W. Cohn, F. H. Crawford, G. H. Dieke, R. H. Frazier, W. R. Fredrickson, J. W. McBain, C. E. Mendenhall, H. H. Plaskett, J. R. Roebuck, F. E. Ross, H. Shapley, J. C. Stearns, H. T. Stetson, and D. C. Stockbarger.

The following recent publications concern researches that have been aided by grants from the Rumford Fund.

Nos.

284. By Prof. T. C. Poulter, Iowa Wesleyan College, "Lens Effect of Pressure Windows," and "Permeability of Glass and Fused Quartz to Ether, Alcohol, and Water," *Physical Review*, June 1, 1932.

Nos.

304. By Prof. J. R. Roebuck, "The Joule-Thomson Effect in Helium," *Physical Review*, Jan. 1932.
298. By Prof. G. W. Kenrick and G. W. Pickard, "Observations of the Effective Height of the Kennelly-Heaviside Layer and Field Intensity during the Solar Eclipse of August 31, 1932," *Proc. Inst. Radio Engrs.*, April 1933, Vol. 21, No. 4, pp. 545-566.
294. By Prof. Harlan T. Stetson, Ohio Wesleyan University, "Sun Spots and Radio Reception," *Smithsonian Report*, 1931, pp. 215-228.
293. By Prof. P. W. Bridgman, Harvard University, "The Compressibility of Eighteen Cubic Compounds," *Proc. Am. Ac. of Arts & Sc.*, Vol. 67, No. 9, Dec. 1932, pp. 345-375.
288. By Prof. J. C. Stearns, Univ. of Denver, *Physical Review*, 1932.
- (a) "Diurnal Variation of Cosmic Rays," with others, Vol. 41, No. 2, pp. 119-126.
 - (b) "Factors Influencing Ionisation Produced by Cosmic and Gamma-Rays," Vol. 40, No. 4, May 15, pp. 636-637.
 - (c) "Solar Component of Cosmic Rays," Sept. 1932, Vol. 42, No. 2, pp. 317-318.

Respectfully submitted,

ARTHUR E. KENNELLY, *Chairman.*

REPORT OF THE C. M. WARREN COMMITTEE.

The Committee had at its disposal at the beginning of the fiscal year 1932-1933, \$2,116.80, of which \$2,060 has been appropriated during the past year.

Since the last annual report grants have been made as follows:

May 13, 1932: To Professor Marston T. Bogert, Columbia University, \$150, to pay for analytical work needed for the publication of certain researches.

May 13, 1932: To Professor Henry Gilman, Iowa State College, \$300, for the purchase of chemicals to be used in connection with his study of organometallic compounds.

May 13, 1932: To Professor Harold Hibbert, McGill University, \$400, to be used in connection with \$1,000, obtained elsewhere, for the purchase of apparatus needed in his research on polysaccharides.

May 13, 1932: To Professor Carl L. A. Schmidt, University of California, \$60, for the purchase of a galvanometer to be used in his study of the physical chemistry of certain proteins.

May 28, 1932: To Professor W. E. Bradt, State College of Washington, \$300, to be used to purchase apparatus needed in the study of the electrochemical properties of the higher melting intermetallic compounds.

May 28, 1932: To Professor Edward Kremers, The University of Wisconsin, \$250, to study the derivatives of the cymene, thymol and carvacrol, hydrothymoquinone, thymoquinone, etc. group to be followed up by bacteriological and pharmacological studies.

December 23, 1932: To Dr. C. R. Johnson, Princeton University, \$100, to be used in the purchase of platinum apparatus required in the determination of certain atomic weights.

December 23, 1932: To Professor E. L. Skau, Trinity College, \$100, to be used in the purchase of liquid air and other materials necessary in his investigation on the purification of organic compounds and the determination of their physical properties.

December 23, 1932: To Dr. Hermann Schmid, Technische Hochschule, Vienna, \$100, to be used for apparatus needed in his work on the study of intermediate substances in chemical reactions.

December 23, 1932: To Professor Wm. Lloyd Evans, The Ohio State University, \$300, to pay for the services of a skilled assistant to continue his work on the action of an aqueous solution of potassium hydroxide on l-Rhamnose and the behavior of aqueous solutions of potassium hydroxide on Wohl's methyl triose.

Fifteen applications are before the Committee for consideration at its next meeting.

Reports of progress, during the current year, have been made by Professors Allen, Bogert, Gilman, Johnson, Schmid, Schmidt, Skau.

The papers listed below, which have been published since the last report of the Committee, describe the results of investigations aided by the Warren Fund. In each case there is an acknowledgment by the author of the assistance received.

C. F. H. Allen and E. W. Spanagel:

(A Communication to the Editor)

"The Structure of the Diketone Obtained from Anhydracetonebenzil."

C. F. H. Allen and E. W. Spanagel:

"The Reactions of Anhydracetonebenzil with Certain Halogen Compounds." *J. Am. Chem. Soc.*, 54, 4338 (1932).

C. F. H. Allen, G. F. Frame, J. B. Normington and C. V. Wilson:

"The Condensation of Certain -Ketonic Esters with Aromatic Aldehydes. II." *Canadian Journal of Research*, Vol. 8, February, 1933.

Henry Gilman and R. H. Kirby:

"The Relative Reactivities of Organolithium and Organomagnesium Compounds." *J. Am. Chem. Soc.*, 55, 1265 (1933).

Willis D. Gallup and Carl L. A. Schmidt:

"The Action of Nitrous Acid on Salmin, Guanidine, Urea, and Certain Related Compounds." *University of California Publications in Physiology*, Vol. 7, No. 12, pp. 201-210, August, 1930.

Evald L. Skau:

"The Purification and Physical Properties of Organic Compounds. I. The Interpretation of Time-Temperature Curves in Freezing Point Determinations and as a Criterion of Purity." *Proceedings of the American Academy of Arts and Sciences*, Vol. 67, No. 12, January, 1933.

Evald L. Skau and Blair Saxton:

"Some Errors Inherent in the Usual Determination of the Binary Freezing Point Diagram." *Journal of Physical Chemistry*, Vol. XXXVII, No. 2, February, 1933.

Evald L. Skau and Blair Saxton:

"The Freezing Point-Solubility Relations of Geometrical Isomers. II. The Dynamic Isomerism of the Anisaldoximes." *Journal of Physical Chemistry*, Vol. XXXVII, No. 2, February, 1933.

David Davidson and Marston T. Bogert:

"Isovioluric Acid (Alloxan-6-Oxime)." *Proceedings of the National Academy of Sciences*, Vol. 18, No. 7, pp. 490-496, July, 1932.

Respectfully submitted,

JAMES F. NORRIS, *Chairman*.

May 10, 1933.

REPORT OF THE COMMITTEE OF PUBLICATION.

The Committee of Publication has held one meeting during the year with all members present. Most of the work of the committee has been carried on by correspondence.

During the year 1932-33 one memoir and fourteen numbers of the Proceedings have been issued. These include numbers 5 to 13 of volume 67 and numbers 1 to 5 of volume 68. Three papers are now in press. A memoir by Dr. L. R. Cleveland has been accepted and the sum of \$3,000 set aside for its publication. The Committee on the Permanent Science Fund will contribute an additional \$1,000 for this purpose. The Committee of Publication has expressed its willingness to spend \$500 annually towards the publication of Professor Lake's collection of Greek minuscule manuscripts. As usual it has been found necessary to decline publication of a number of manuscripts submitted by non-members of the Academy.

The Treasurer renders the following financial statement for the year April 1, 1932 to April 1, 1933.

Receipts.

Balance April 1, 1932 . . .	\$10,338.47
Appropriation 1932-33. . .	3,282.25
Rumford Fund Balance . . .	1,004.87
Receipts from sales. . . .	503.49

Available for publication 1932-

33	\$15,129.08
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Expenses.

Publication Fund Expendi- tures	\$ 5,345.24
Rumford Fund Expenditures .	754.98

Total 6,100.22

Unspent Balance April 1, 1933	\$ 9,028.86
Appropriation 1933-34.	2,223.00

Available for publication 1933-34. \$11,251.86

The committee desires to express its appreciation of the generous financial assistance given by the Rumford Committee, by the Committee on the Permanent Science Fund, and by the American Council of Learned Societies. Mr. Marshall, representing the latter organization, is helping the committee to secure a suitable publisher of the Greek minuscule manuscripts collected by Professor Kirsopp Lake.

In accordance with recommendations made by the special committee appointed by President Ford it is planned to distribute annually to all Fellows of the Academy and to all Foreign Honorary Members a copy of the records number of the Proceedings. With the assistance of the Secretaries a special brochure giving a general account of the nature of the Academy and the scope of its activities is to be prepared for distribution.

Respectfully submitted,

H. V. NEAL, *Chairman.*

May 10, 1933.

REPORT OF THE HOUSE COMMITTEE.

The House Committee has had funds at its disposal amounting to \$3,369.26, made up as follows:

Balance from previous year	\$ 400.35
Appropriations for 1932-33	2,700.00
Received for use of rooms and telephone	268.91
	<hr/>
	\$3,369.26

Of this amount the sum of \$2,259.73 has been spent for the routine expenses, janitor, light, power, heat, telephone, etc., and \$702.96 has been spent for upkeep and equipment, making a total of \$2,962.69, and leaving an unexpended balance of \$406.57. The chief items of upkeep this year have been the re-caning of the lecture hall chairs and extensive repairs on the metal and glass front doors of the Academy's house. Quite a saving has been effected by using coke instead of anthracite coal for heating, with satisfactory results.

Meetings have been held as follows:

The Academy	8
American Antiquarian Society	1
American Chemical Society, Northeastern Section.	6
Archaeological Institute of America, Boston Society	2
Harvard-Technology Chemical Club.	1
Japan Society of Boston	3
Massachusetts Girl Scouts.	2
Mediaeval Academy of America	1
New England Botanical Club.	9
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Total	33

The Council Chamber has been used for Academy Council and Committee meetings, and also by the Trustees of the Children's Museum, the New England Farm and Garden Association, the Thursday Evening Club, etc.

A detailed list of expenditures follows:

Janitor	\$ 976.00
Electricity {Light.	233.10
{Power.	108.12
Fuel.	563.95
Elevator.	88.25
Gas	65.10
Telephone	108.84
Water	77.28
Ash tickets.	9.90
Upkeep.	691.96
Furnishing and equipment	11.00
Janitor's supplies and sundries	29.19
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Total.	\$2,962.69

Respectfully submitted,

S. BURT WOLBACH, *Chairman*.

May 10, 1933.

It was *Voted*, To award the Rumford Premium to Dr. Harlow Shapley for researches on the luminosity of stars and galaxies.

On the recommendation of the Treasurer, it was *Voted*, That the annual assessment for the ensuing year be \$15.

On the recommendation of the Treasurer, it was *Voted*, That the Statutes be amended so as to allow the appointment of a special committee to administer the Amory Fund.

The annual election resulted in the choice of the following officers and committees:

GEORGE H. PARKER, *President*

HARRY M. GOODWIN, *Vice-President for Class I*

WALTER B. CANNON, *Vice-President for Class II*

EDWIN F. GAY, *Vice-President for Class III*

ARTHUR S. PEASE, *Vice-President for Class IV*

TENNEY L. DAVIS, *Corresponding Secretary*

WALTER E. CLARK, *Recording Secretary*

INGERSOLL BOWDITCH, *Treasurer*

ALFRED C. LANE, *Librarian*

HERBERT V. NEAL, *Editor*

Councillors for Four Years.

JOHN C. SLATER, of Class I

JOHN H. WILLIAMS, of Class III

JOHN W. M. BUNKER, of Class II

WILLIAM C. GREENE, of Class IV

Finance Committee:

THOMAS BARBOUR

PAUL J. SACHS

ALFRED L. RIPLEY

Rumford Committee.

ARTHUR E. KENNELLY

ELIHU THOMSON

HARRY M. GOODWIN

HARLOW SHAPLEY

PERCY W. BRIDGMAN

CHARLES L. NORTON

NORTON A. KENT

C. M. Warren Committee.

JAMES F. NORRIS

GREGORY P. BAXTER

ARTHUR D. LITTLE

REID HUNT

WALTER L. JENNINGS

FREDERICK G. KEYES

CHARLES A. KRAUS

*Committee of Publication.*HERBERT V. NEAL, *Chairman*

EDWIN C. KEMBLE, of Class I	JOSEPH H. BEALE, of Class III
FREDERIC T. LEWIS, of Class II	ROBERT P. BLAKE, of Class IV

*Committee on the Library.*ALFRED C. LANE, *Chairman*

RAYMOND C. ARCHIBALD, of Class I	WILLIAM Y. ELLIOTT, of Class III
THOMAS BARBOUR, of Class II	HENRY B. WASHBURN, of Class IV

Auditing Committee.

GEORGE R. AGASSIZ

JOHN E. THAYER

*House Committee.*S. BURT WOLBACH, *Chairman*

WILLIAM H. LAWRENCE	ROBERT P. BIGELOW	DAVIS R. DEWEY
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Committee on Meetings.

THE PRESIDENT

THE RECORDING SECRETARY

DANIEL F. COMSTOCK	LEIGH HOADLEY	CHARLES J. BULLOCK
JOSHUA WHATMOUGH		

The Corresponding Secretary announced that the following had been elected members of the Academy:

FELLOWS.

CLASS I.

- Section 1.* Jesse Douglas, Cambridge
Marshall Harvey Stone, New Haven, Conn.
- Section 3.* Louis Frederick Fieser, Waltham
George Bogdan Kistiakowsky, Cambridge
Henry Weeden Underwood, Jr., Cambridge
- Section 4.* Harold Kilbrith Barrows, Winchester
Arthur Edwin Norton, Cambridge
Frank Edward Winsor, West Newton

CLASS II.

- Section 1.* Charles Franklin Brooks, Milton
Frank Morton Carpenter, Cambridge
- Section 3.* Philip Bard, Cambridge
Alden Benjamin Dawson, Cambridge
Frank Rattray Lillie, Chicago, Ill.
Jeffries Wyman, Jr., Chestnut Hill
- Section 4.* Reginald Fitz, Brookline
Edgar Erskine Hume, Washington, D. C.
George Burgess Magrath, Boston
George Cheever Shattuck, Brookline
Soma Weiss, Cambridge

CLASS III.

- Section 1.* Harry Augustus Bigelow, Chicago, Ill.
Henry Wolf Biklé, Philadelphia, Pa.
Benjamin Nathan Cardozo, Washington, D. C.
John Dickinson, Philadelphia, Pa.
Theodore Francis Green, Providence, R. I.
Learned Hand, New York, N. Y.
Harlan Fiske Stone, Washington, D. C.
- Section 2.* Sir Herbert Brown Ames, Brookline
George Hubbard Blakeslee, Worcester
Edwin Montefiore Borchard, New Haven, Conn.
Robert Treat Crane, New York, N. Y.
Bruce Campbell Hopper, Cambridge
Henry Aaron Yeomans, Cambridge
- Section 3.* Harold Hitchings Burbank, Cambridge
Sheldon Glueck, Cambridge
Edward Sagendorph Mason, Cambridge
Robert Ezra Park, Chicago, Ill.
Josef Alois Schumpeter, Cambridge
William Isaac Thomas, New York, N. Y.
Abbott Payson Usher, Belmont
- Section 4.* George Hoyt Bigelow, Milton
James Vance May, Boston
Albert Warren Stearns, Billerica

Class IV.

- Section 1.* Gordon Willard Allport, Cambridge
John Gilbert Beebe-Center, Swampscott
James McKeen Cattell, New York, N. Y.
Curt John Ducasse, Providence, R. I.
Walter Samuel Hunter, Worcester
Lee Sullivan McCollester, Tufts College
Carroll Cornelius Pratt, Cambridge
Howard Crosby Warren, Princeton, N. J.
Frederic Lyman Wells, Newton Highlands
- Section 2.* Henry Thatcher Fowler, Providence, R. I.
Halford Lancaster Hoskins, Tufts College
Edward Sapir, New Haven, Conn.
- Section 3.* William Nickerson Bates, Philadelphia, Pa.
Campbell Bonner, Ann Arbor, Mich.
Carleton Brown, Upper Montclair, N. J.
Hans Kurath, Providence R. I.
Ivan Mortimer Linforth, Berkeley, Cal.
Howard Rollin Patch, Northampton
George Benson Weston, Cambridge
Harry Austryn Wolfson, Cambridge
Karl Young, New Haven, Conn.
- Section 4.* John Alden Carpenter, Chicago, Ill.
Charles Collens, Newton Center
Cyrus Edwin Dallin, Arlington
Carl Engel, Washington, D. C.
Leo Rich Lewis, Tufts College
David Stanley Smith, New Haven, Conn.
Charles Herbert Woodbury, Boston

FOREIGN HONORARY MEMBERS.

CLASS I.

- Section 3.* Jaroslav Heyrovsky, Prague, Czechoslovakia
Fritz Paneth, Königsberg, Germany

CLASS II.

- Section 3.* Hans Spemann, Freiburg i. B., Germany
Section 4. Sir Arthur Keith, London, England

CLASS III.

- Section 1.* Frantz Dahl, Copenhagen, Denmark
François Geny, Nancy, France
Hans Kelsen, Cologne, Germany
Julius Makarewicz, Lwów, Poland
Rudolf Stammer, Berlin, Germany
Giorgio Del Vecchio, Rome, Italy
Section 3. Werner Sombart, Berlin, Germany
Section 4. Gösta A. Bagge, Stockholm, Sweden
Sir Josiah Stamp, London, England

CLASS IV.

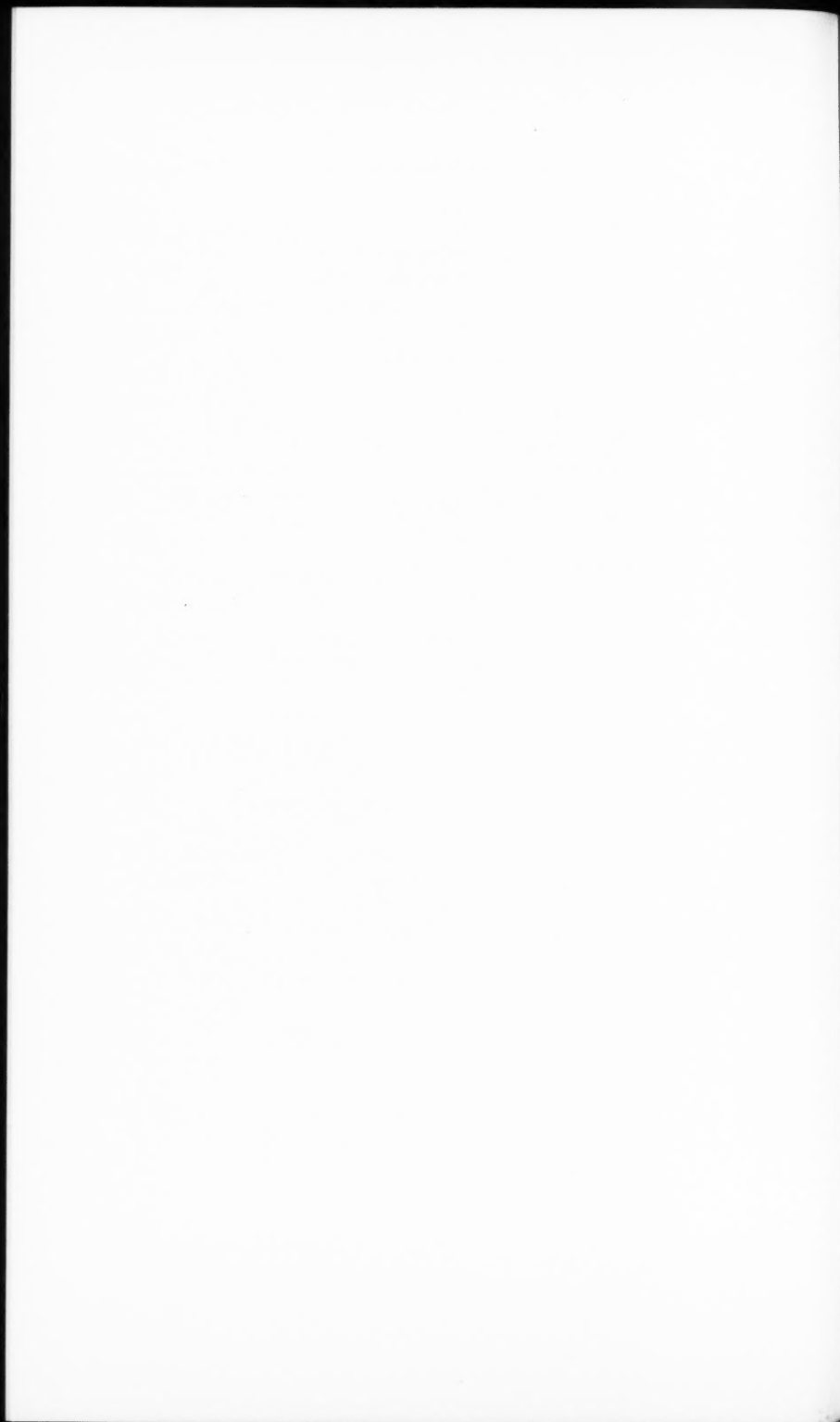
- Section 1.* Georg Elias Müller, Göttingen, Germany
Section 2. Rafael Altamira y Crevea, Madrid, Spain
Friedrich Meinecke, Berlin, Germany

The following communication was presented:

Mr. H. Helm Clayton: "Recent Studies of Solar and Weather Relationships."

Two papers were read by title: "A Suggestion concerning Plato's Atlantis," by W. A. Heidel; "The Significance of Cells as Revealed by their Polyhedral Shapes, with Special Reference to Precartilage, and a Surmise concerning Nerve Cells and Neuroglia," by Frederic T. Lewis.

The meeting was dissolved at 10.20 P. M.



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THE RT. HON. SIR CLIFFORD ALLBUTT (1836-1925).

Foreign Honorary Member in Class II, Section 4. 1922.

Sir Clifford Allbutt was born at Dewsbury in Yorkshire and died at Cambridge, England, February 22, 1925, in the eighty-ninth year of his life.

For years he was the acknowledged leader in British medicine and remained active in medical work up to the time of his sudden death after a few minutes of acute dyspnea. Allbutt, more than any other English speaking physician of his time, was an exponent of a clear, forceful and delightfully scholarly use of the English language. All that he wrote might be read with profit and pleasure both as a literary production and as a scientific presentation.

He entered Gonville and Caius College in 1857 and graduated in the first class of the Natural Science Tripos. His medical education was continued at St. George's Hospital in London and while there he graduated in medicine at Cambridge. Leeds became his residence and there he rapidly became a busy general practitioner, later with a huge consulting practice, while busied with the duties of physician to the Leeds General Infirmary, Leeds Hospital for Women and Children, and Leeds Fever Hospital. In 1868, while still at Leeds, he had an active part in the perfecting of the clinical thermometer as we know it today and was largely instrumental in its becoming generally used in medicine.

A little later in a somewhat similar way he busied himself with perfecting the ophthalmoscope and in impressing upon the medical profession its great value as an instrument for clinical use. In 1871 he published the first book on the use of the ophthalmoscope, in which he stressed particularly its value in the study of diseases of the nervous system and of the kidneys.

He became Commissioner in Lunacy and for three years admirably filled that difficult office just prior to going to Cambridge. He was well over fifty years of age when he went to Cambridge as Regius Professor of Physic, but in a surprisingly short time he took a front place in the academic life of that university. Then, about this time he began the editorship of a *System of Medicine*, which remains as one of the best of this type of medical work. He was particularly

interested in diseases of the circulation and his two-volume work, "Diseases of the Arteries Including Angina Pectoris," remains today a mine of information on this subject. His views on high blood pressure were of great importance in developing our knowledge of cardiovascular disease in its forms which today are so prevalent and important as the cause of death in full vigor of middle age of so many important men from all branches of modern society.

In his long life of such great activity Sir Clifford Allbutt held many of the important offices in the various medical and scientific organizations of Great Britain, received numerous honorary degrees and was foreign member or corresponding member of many organizations.

He left an important impress on British medicine, which is reflected in American medicine. From May 10, 1922, until the time of his death he was a Foreign Honorary Member of the American Academy of Arts and Sciences.

HENRY A. CHRISTIAN.

NATHANIEL ALLISON (1876-1932).

Fellow in Class II, Section 4, 1925.

Nathaniel Allison, M.D., born in Webster, Missouri, was the grandson of Dr. Nathaniel Allison, pioneer physician of Audrain County, Missouri. He was the son of James Allison, successful merchant, and of Addie (Shultz) Allison. His progenitors were English, emigrating to America in colonial days and fighting in the War of Independence. His father, early in Dr. Allison's life, moved to Saint Louis and the son was educated at Smith Academy. When he was seventeen he received an appointment to West Point, but largely owing to admiration for his grandfather, he resigned from the military academy at the end of a year and determined to study medicine. Further study at the Penn Charter School in Philadelphia enabled him to enter Harvard University in 1894 and he was graduated from the medical school in 1901. The specialty of orthopaedic surgery attracted him and after post graduate study at the Boston Children's Hospital he returned to Saint Louis and began practice in his chosen field.

Almost at once his ability for research became apparent and remained of almost chief concern to him throughout his medical career. In 1909 he married Marion Aldrich of Chicago.

The respect for his ability steadily increased until before the great war he had become outstanding in his specialty and chief of the Department of Orthopaedic Surgery of Washington University and of its allied hospital clinics. In 1915, he served with the American Ambulance in Paris and in 1917 was commissioned as captain in the United States Army Medical Corps, sailing for France in May with the Washington University unit for service in a base hospital in Rouen. He was a member of an Army Board appointed to standardize splints and dressings, and after the publication of this manual was chiefly responsible in arranging for the manufacture and delivery of these necessities to our combat troops and to all overseas United States Army hospitals. This meritorious service was splendidly executed and he rose to the rank of Colonel and Assistant Director of the A. E. F. Section of Orthopaedic Surgery. On his return to America in 1919 he was assigned to the Walter Reed Army Hospital at Washington as assistant director of the surgical service. He was honorably discharged from the army and was sent in September 1919 to Rome as representative of the United States Medical Department at the Inter-allied Congress of Surgery. The Distinguished Service Medal was awarded him by the President of the United States.

Civil practice was resumed in Saint Louis and to his old teaching and hospital responsibilities were added those of the deanship of the Washington University Medical School. In 1923 he was offered the post of chief of the Orthopaedic Department of the Massachusetts General Hospital and a place on the faculty of the Harvard Medical School. These positions he accepted and he was made a full Professor of Orthopaedic Surgery in 1924. Dr. Allison was a vital part of the medical life of Boston for six years. In 1929 he was invited to occupy the chair of Professor of Surgery in charge of the Division of Orthopaedic Surgery at the Medical School of Chicago University. He served in this important capacity until 1932, when relapsing illness made it necessary for him to lay down his duties.

Dr. Allison's bibliography encompassed nearly every domain of orthopaedic surgery. He never lost his acute interest in research and

exhibited an unique faculty for applying the results of research to the relief of physical handicap and disease.

The list of medical and civic societies to which he belonged is a long one and included the American Academy of Arts and Sciences, to which he was elected on May 13, 1925, The American College of Surgeons, The New England Surgical Society, The American Orthopaedic Association (President 1922), The International Society of Orthopaedic Surgery, The American Medical Association, The Southern Surgical Association, The Association of Military Surgeons, The Massachusetts Medical Society, The Massachusetts Association for Occupational Therapy (President 1925-1929), The St. Louis Surgical Society, The Boston Surgical Society, Honorary Membership in the British Orthopaedic Association, Corresponding Membership in the Société des Chirurgiens de Paris, and many other medical and urban clubs in St. Louis, Washington, and Boston.

It has been said of him that "wherever this genial but self-contained and unhurried physician practised he became a vital element in the professional life of the community and the trusted adviser of important medical institutions. He was independent in thought and action and by the exercise of his own wisdom and effort usually attained the end sought. He broadened the scope of orthopaedic surgery by research and increased its prestige by the respect in which he was held by medical and surgical colleagues; a respect engendered by his knowledge of men and of medicine."

ROBERT B. OSGOOD.

SOLON IRVING BAILEY (1854-1931).

Fellow in Class I, Section 1, 1892.

Born December 29, 1854, at Lisbon, N. H., son of Israel C. and Jane Sutherland Bailey; died at Norwell, Mass., June 5, 1931.

In 1859 the Bailey family moved from Lisbon to Concord, N. H., where Solon attended high school. He later entered Tilton Academy, graduating in 1877.

Degrees: A.B., 1881, A.M., 1884, Boston University; A.M., 1888, Harvard University.

From 1881 to 1884 he was headmaster of Tilton Academy. In 1883 he married Ruth E. Poulter of Concord, N. H. She and their son, Irving W. Bailey, Professor of Plant Anatomy at Harvard, survive him.

In 1887, he came to Harvard, becoming volunteer assistant at the Observatory.

University appointments:

Assistant in Astronomy	1891-1892
Assistant Professor	1893-1898
Associate Professor	1898-1912
Phillips Professor	1912-1925
Acting Director	1919-1921
Phillips Professor Emeritus	1925-1931

In 1888 he was sent to investigate the mountains on the west coast of South America as a possible site for an observatory. On his recommendation Arequipa, Peru (altitude 8,000 feet), was chosen as a site for a permanent station of the Harvard Observatory to be constructed from the Boyden Fund. In 1893 he established a meteorological station on the summit of El Misti at an elevation of 19,000 feet.

Professor W. H. Pickering took charge of the station at Arequipa from 1891 to 1893 while Professor Bailey was absent. Thereafter the station remained virtually in Professor Bailey's care until 1924. He alternated his time between Cambridge and Peru, his last visit to the latter being in 1922.

"His name should always be honorably associated with the great development of astronomy which began during the last decade of the nineteenth century, for his pioneer labors in the photography of the southern stars helped to open up the whole sky to modern astronomers, and his early investigations of variable stars in globular clusters provided an important foundation stone for the structure of the new cosmogony." And in meteorology his study of Peruvian meteorology, based on ten years of records from El Misti and other stations he established at various altitudes down to sea level, is unique.

In 1908 his investigations of the meteorological conditions in South Africa were the basis upon which many observatories selected sites for South African stations.

Memberships: Fellow Am. Acad. of Arts and Sciences; A. A. A. S.;

Washington Acad. Sciences; mem. Nat. Acad. Sciences; Am. Astron. Soc.; Geog. Soc. of Lima; Int. Astron. Union; Astronomische Gesellschaft; Asso. Royal Astron. Soc.

He received an honorary Sc.D. and the title of Professor of Astronomy in the University of San Augustin, Peru, in 1923.

"Those who have known him as the courteous gentleman, the genial host, the wise counsellor, and wholly delightful comrade will sorely miss the inspiration of his great soul."—Professor E. S. King.

L. B. ANDREWS.

SIMEON EBEN BALDWIN (1840–1927).

Fellow in Class III, Section 1, 1912.

Simeon E. Baldwin was born in the year 1840, graduated at Yale in 1861, and studied law at the Yale and the Harvard Law schools. He was a member of the faculty of the Yale Law School from 1869 to shortly before his death. He was a justice of the Supreme Court of Errors of Connecticut in 1893 and chief justice in 1907, until in 1910 he was forced to retire because of the compulsory retirement law of Connecticut. He was one of the founders of the American Bar Association and at one time its president. He received the degree of Doctor of Laws from Harvard University in 1891.

After his retirement from the Supreme Court he was elected governor and served with success for the usual number of terms. He died in 1927 at the age of 87 years, being vigorous to the end.

Judge Baldwin was a man of strong character and firmly-held opinions; an excellent lawyer, a good administrator and a man of very high character and interesting personality. He was a very vigorous man and delighted in walking and climbing. His vigor colored his opinions as judge and his teaching as a professor of law and his action as governor. He could be wrong at times, and he was just as persistent in error as he was in the truth, but being a sound and learned lawyer he was seldom in error. He was greatly loved by his colleagues and his students and there was universal dissatisfaction at the time of his forced retirement from the bench. Judge Baldwin was elected a non-resident member of the Academy in May 1912.

J. H. BEALE.

LOUIS AGRICOLA BAUER (1865-1932).

Fellow in Class I, Section 2, 1912.

He was born in Cincinnati, January 26, 1865. He received the degree of C.E. from the University of Cincinnati in 1888 and the Ph.D. from Berlin in 1895. He was a teacher for some years, first at the University of Chicago, later at the University of Cincinnati, but from 1899 on, most of his work was done in the U. S. Coast and Geodetic Survey or in the service of the Carnegie Institution at Washington. His special field was terrestrial magnetism. His work in this field was conspicuous and gained for him wide recognition both at home and abroad.

EDWIN H. HALL.

MELVILLE MADISON BIGELOW (1846-1921).

Fellow in Class III, Section 1, 1911.

Melville Madison Bigelow was born in Michigan, August 2, 1846. He received his degree of A.B. in 1866, LL.B. in 1868 and A.M. in 1871 at the University of Michigan. Coming to Boston directly after leaving his university, he presented, in 1872, a scheme for the organization of the law school in the Boston University, largely on the current model of the Michigan Law School, and was made professor there and so continued for 50 years. During that period he was dean for 9 or 10 years and upon leaving the deanship he became a graduate instructor. He died in the year 1921.

Professor Bigelow was a lawyer, a teacher, an historian and a poet. For the degree of Ph.D. in Harvard he prepared, and in 1872 published, his *Placita Anglo Normanica*, and a few years later his *History of English Procedure*. He was a valued member of the Massachusetts Historical Society and was always interested in the historical aspects of law. He was also an author of professional treatises on the law, and in that way, between 1872 and 1898, he published treatises on Estoppel, Torts, Bills and Notes, Fraud, and Wills, which were kept alive by frequent editions. In his later years he turned to legal philosophy, publishing books on the Legal History of Government, and was one of the authors of *Centralization and the Law*.

Professor Bigelow was essentially a scholar. He taught all his life a group of students not especially interested in the scholarly aspects of the law, and succeeded in winning their respect, their admiration and their affection. For many years before his death he was invested by his students with a halo of legal sanctitude, and his position in his law school was a happy as well as an honorable one. In the profession at large his place was very high and he was honored for his scholarship in his own country and abroad. He was elected a Fellow of the Academy in October 1911.

J. H. BEALE.

ROLAND WILLIAM BOYDEN (1863-1931).

Associate, 1928; Fellow in Class III, Section 4, 1931.

Roland W. Boyden was born in Beverly, October 18, 1863. He received his bachelor's degree in arts from Harvard College in 1885 and his bachelor's degree in law from the Harvard Law School in 1888. He was made doctor of laws by Harvard in 1924.

From 1894 to his death he was a member of the firm of which the latest title was Ropes, Gray, Boyden & Perkins. In 1917 to 1919 he was counsel for the United States Commission, and for several years later was the unofficial observer for the United States with the Reparations Committee, and took an important part in the deliberations of that body. In 1930 he became a member of the Permanent Court of Arbitration at the Hague, and was a member of the Mixed Claims Commission between Germany and America. From 1924 to 1930 he was an Overseer at Harvard College. In granting his honorary degree, President Lowell characterized him as "an American whose patriotism is not bounded by the shores of his native land, who strove to bring order into the financial chaos of a weary world." He died suddenly, October 25, 1931.

Throughout his professional life Boyden was characterized by Yankee shrewdness and good business sense. He was tolerant of others' opinions, but clear and firm in his own. His advice was sought and followed by all his associates, and he became the outstanding man in Massachusetts in all legal relations with Europe.

He received numerous foreign decorations. Just before his death he had been selected as president of the Reparations Arbitral Commission to settle disputes under the Dawes and Young Plan.

Boyden was full of the simplicity and sincerity of his race. Always interested in athletics, he would take the time from a puzzling case to talk baseball or to gossip about old times. It was well said of him that "he liked good wine, good food and human companionship, and he brought to his amusements a zest and energy as great as that he showed in his work." The characteristics of friendliness and simplicity proved very attractive in his public work, and all his associates in that work will greatly miss his cordiality and sympathetic dealing with public problems.

J. H. BEALE.

HENRY ANDREWS BUMSTEAD (1870-1920).

Fellow in Class I, Section 2, 1914.

My personal acquaintance with Henry A. Bumstead dates from a meeting of the British Association in Winnipeg in the summer of 1909. He had studied in Cambridge, England, where his engaging personality, keen intelligence, and unusual *savoir faire* had made him a place in the hearts and homes of English scientists which has been held by few Americans. I was then almost unknown both to him and to them, but I soon learned that if Bumstead was in any gathering I should at once feel at home.

I was walking with him one day through one of the busy streets of Winnipeg when he asked if I would not step into a shop with him while he bought a little memento for Mrs. Bumstead, a "bad habit" which he said he had formed on trips away from home.

I mention these two trivial incidents because they reveal the soul and heart of the man; and what, after all, is either science or art in comparison?

When in 1917 the important and difficult post of scientific attaché in London was created, Bumstead was the only man considered, for no scientist in this country had his tact, his judgment, his knowledge of England, and his ability to assist in bringing about what was then, and what is now, the most important need of the modern world,

namely, the coöperation and mutual understanding of the two great branches of the Anglo-Saxon race.

Bumstead's success in London was extraordinary. The British liked and trusted him. Admiral Sims and our own War Department placed large responsibilities upon him, and his office became the center of a very active and very important service. Young American officers who went abroad on scientific missions found him the center of their contacts and the prime source of their usefulness. They all became his devoted admirers. Not one or two but a dozen or more of both British and American officers who came to Washington during the war told me that they owed their success primarily to Bumstead, and counted it the most valuable part of their experience that they had had an opportunity to become acquainted with him. One of these officers described him as the most influential American in England.

As Chairman of the National Research Council, as member of the National Research Fellowship Board, and as participant in other important groups with which he was associated at the time of his death, Bumstead showed the same broad outlook, the same big human interest, the same tact, the same sane intelligence and sound judgment which had characterized his work in England.

He spent practically the whole of the holiday week, 1920, at my home in Chicago in attendance upon the meetings of the Physical Society and of various committees of which he was a member. He was apparently in the best of health and spirits. Indeed, he spent Friday morning, December 31, going over with me the research work of the Ryerson Laboratory, and as we chatted together before he left about future plans he remarked that since his last operation some four years ago he had been feeling in excellent condition. He left me at about 11:30, intending to take the afternoon train for Washington. The next morning Dr. Vernon Kellogg, who occupied the berth opposite him, attempted to waken him and found that he had gone.

His passing has left a big gap in the ranks of American physicists. He was born on March 12, 1870, in Pekin, Illinois, and educated in the public schools of Decatur, from which he went first to Johns Hopkins, where he took his Bachelor of Arts degree in 1891, and then

to Yale, which conferred upon him the degree of Doctor of Philosophy in 1897. From 1891 to 1900 he was connected with the Sheffield Scientific School of Yale, first as assistant and later as instructor, and from 1900 to 1906 he was assistant professor at Yale. In 1906 he became a full professor and director of the Sloane Physical Laboratory, which position he held till the time of his death. He was a very influential member of the Yale faculty, a member of the National Academy of Sciences, a member of the American Physical Society, of which he was President in 1918, a member of the Connecticut Academy of Sciences, the American Philosophical Society, and a Fellow of the American Academy of Arts and Sciences. He had a brilliant analytical mind, profound scholarship, exceptional critical capacity, excellent judgment, an extraordinarily winsome personality, the finest culture, and a great heart. His personal scientific contributions were important, though they had been much interfered with by his none too rugged health. His effect upon American physics, however, was not limited to his own scientific papers, but he exerted a powerful influence upon his pupils and upon his fellow physicists.

It is not merely American science, however, which can ill afford to lose him twenty years before his time. American life in all its aspects is sadly in need of men of Bumstead's type. The cause of sanity, of culture, of Anglo-Saxon solidarity, of scholarship, of science, of world civilization, all suffer irreparably through his death.

R. A. MILLIKAN.

FLORIAN CAJORI¹ (1859-1930).

Fellow in Class I, Section 1, 1921.

Florian Cajori, professor emeritus of mathematics at the University of California, died at his home in Berkeley, 14 August 1930, after a

¹ This sketch is an abridgment of one by the writer which appeared in *Isis* in April 1932, v. 17, p. 386-407 + portrait plate; a complete bibliography of 286 titles is given on pages 389-407. Other published sources of information concerning Professor Cajori are: *American Men of Science*, fourth ed., New York, 1927. *Who's Who in America*, v. 16 (1930-1931). L. G. Simons, *Amer. Math. Mo.*, v. 37, Nov. 1930, p. 460-462. D. E. Smith: (a) *Science*, n. s., v. 72, 19 Sept. 1930, p. 287-288; (b) *Amer. Math. So., Bull.*, v. 36, Nov. 1930, p. 777-780, portrait; (c) *Archeion, Archivio di Storia della Scienza*, v. 12, 1930, p. 369-371.

brief attack of pneumonia, in the seventy-second year of his age. For forty years his name had been a familiar one throughout the world, recalling a genial personality and a prolific writer on various topics connected with the history of mathematics and physics.

He was born at St. Aignan near Thusis, Switzerland, 28 February 1859. His mother was Catherine (Camenisch), and his father was Georg Cajöri (the family name was spelled thus, or as Cajoeri), an engineer and contractor, well known in his part of Switzerland for important bridges and highways that he built.

Professor Cajori received his early education at Zillis, and in the canton school at Chur. At the age of 16 years he came to America, an elder brother having preceded him, and made his way at once to Whitewater, Wisconsin, where he continued his education at the normal school during the years 1876-78. After some teaching in a country school he entered the University of Wisconsin where he received the degrees of Bachelor of Science in 1883, and of Master of Science in 1886. From January 1884 to June 1885 he was a graduate student of mathematics at The Johns Hopkins University, and received his first academic appointment in the following autumn. This was at Tulane University, New Orleans, where he was an assistant professor of mathematics 1885-87, and professor of applied mathematics 1887-88. Since, on account of his health, a change of climate seemed very desirable, he spent the next year in collecting material for a forthcoming work and accepted a position at Colorado College, Colorado Springs, where he was first a professor of physics 1889-98, then professor of mathematics 1898-1918, and dean of the department of engineering 1903-18. During these twenty-nine years not only did he always carry a heavy teaching load, but also served in various administrative capacities for which he was ideally qualified. But in spite of all such demands upon his time, even though far removed from adequate library facilities, he achieved a remarkable quantity of publication. Throughout life he possessed to an extraordinary degree the ability to utilize every spare minute, taking up intensively at a moment's notice the consideration of any particular question. He was greatly interested in college athletics and followed enthusiastically both the regular and practice games, especially in football. He always walked a great deal in the mountains near

Colorado Springs, and later, to a more limited extent, in the Berkeley Hills.

Some of Cajori's principal publications of this period were *The Teaching and History of Mathematics in the United States* (Bureau of Education, Washington, D. C., 1890, 400 p.), involving a great amount of careful research; *History of Mathematics* (1894, 422 p.; second ed. revised and enlarged, 1919, 524 p.); *A History of Elementary Mathematics with Hints on Methods of Teaching* (1896, 312 p.; revised and enlarged ed., 1917), translated into Russian (1910) and Japanese (1928); *A History of Physics in its Elementary Branches including the Evolution of Physical Laboratories* (1899, 330 p.; revised and enlarged ed., 1929, 437 p.; two Italian editions, 1909 and 1929); *An Introduction to the Modern Theory of Equations* (1904, 249 p.); and in 1908 the excellent 160-page section on "Arithmetik. Algebra Zahlentheorie" in volume 4 of Cantor's monumental work *Vorlesungen über Geschichte der Mathematik*.

With such a record to his credit the University of California but extended her own prestige by appointing Cajori, 1 July 1918, professor of the history of mathematics, one of the few chairs of the kind in the world. Freed at last from all administrative duties, and enthusiastic over the opportunity presented for devoting all of his energies to the problems of teaching, research, and publication in the field which he loved, his productivity increased by leaps and bounds; 159 notes, papers, memoirs, and books are assignable to the twelve years in California. Since he became professor emeritus 1 July 1929 he was then freed from teaching obligations, and was thus enabled to proceed with even greater singleness of purpose to draw upon the accumulated stores of his erudition. But an illness resulting in a serious operation occurred in February 1930, and greatly sapped his vitality.

During this California period Cajori's most notable publications were in connection with mathematical notations, the history of various matters connected with the calculus, fluxions, and partial differential equation, and work of Newton. His monumental work on *Mathematical Notations* (2 v., 1928-29, 852 p.), original in conception, must be of enduring value. Three somewhat extensive and interesting papers may be mentioned along with this, namely: "The

history of notations of the calculus" (1923), "Leibniz, the master builder of mathematical notations" (1925), and "A list of Oughtred's symbols with historical notes" (1920).

Another important book was his *History of the Conceptions of Limits and Fluxions in Great Britain from Newton to Woodhouse* (1919, 307 p.) published shortly after going to California. With this may be coupled "Grafting the theory of limits on the calculus of Leibniz" (1923), "Newton's fluxions" (1928), and "The early history of partial differential equations and of partial differentiation and integration" (1928) of which a Spanish translation (1929) was also published.

As to further work of Newton Cajori's discussion of the question of the "twenty years' delay in announcing the law of gravitation" (1928), read at the Newton bicentenary celebration, was complete and satisfying. For many years Cajori had talked of bringing out a new edition of Newton's *Principia* with notes. The older translations of Motte and Thorp were difficult of access, and left much to be desired. It was therefore with great satisfaction that his colleagues learned that the complete manuscript, ready for the printer, was found among his papers. It is hoped that this may soon be published by the University of California.

Professor Cajori did comparatively little work with manuscript source material; practically all of his discussions were with reference to printed documents. But in this respect he performed great services. Hundreds of points, and scores of connected accounts of topics, will hereafter be noted and have their proper settings, because of his presentations of the facts.

Supplementary to our earlier list of extra-academic honors it may be noted that Professor Cajori was vice-president of the American Association for the Advancement of Science and chairman of Section L (Historical and Philological Sciences) in 1923; vice-president of the History of Science Society in 1924-25; and vice-president of the Comité International des Sciences in 1929-30.

He was a man, exceeding modest in bearing, lofty in his ideals as to personal conduct and as to the search for scientific truths, especially endowed with good judgement, blessed with the most gentle kindness of spirit and with intense interest in others and their problems, and

a man who could be the finest of friends. The memory of the beauty of his personality lingers as a precious, fragrant, and inspiring possession of hosts of his students and friends, left behind for a space.

RAYMOND CLARE ARCHIBALD.

JAMES COOLIDGE CARTER (1827-1905).

Fellow in Class III, Section 1, 1896.

James Coolidge Carter was born at Lancaster, Massachusetts, October 14, 1827. He was graduated at Harvard College in 1851 and the Harvard Law School in 1853. He went to New York where his ability won quick recognition. He was associated with Charles O'Connor in the prosecution of the Tweed ring in 1875, was a member of the commission to devise a form of municipal administration for the cities in New York in 1888, and a member of the Constitutional Convention in 1893. He was one of the counsel for the United States in the Fur Seal arbitration, and argued many questions of general and constitutional importance. Perhaps his most important argument was that in favor of the constitutionality of the income tax law. He was throughout his life a foe of codification. At the time of his death he had been appointed to give a course of lectures on the subject in the Harvard Law School, and his notes for these lectures were published after his death in the book entitled "Law: its Origin, Growth and Function." He died on February 14th, 1905.

He cannot be better characterized than in the dedication of Professor J. B. Thayer's book on Evidence, "who throughout a professional career which has placed him high among the leaders of the Bar of the United States has never been wanting to the larger interests of his profession and his country, when wisdom, eloquence and generous courage might serve them." He was the first President of the Harvard Law School Association, founded in 1886, and made a masterly address at the first meeting of the association. On the same occasion Mr. Joseph Choate advised the students to come to New York, for, he said, "Mr. Carter will soon retire and leave room for a thousand." Mr. Carter's retirement, however, was delayed for 20 years. Mr. Carter was elected a non-resident member of the Academy in 1896.

J. H. BEALE.

JOHN JOSEPH CARTY (1861-1932).

Fellow in Class I, Section 4, 1915.

General John J. Carty, pioneer in the development of the telephone, died in the Johns Hopkins Hospital, Baltimore, Maryland, on December 27, 1932. He was born on April 14, 1861, in Cambridge, Massachusetts. At the completion of his preparation for college, he was obliged because of a temporary impairment of his eyesight, to discontinue further formal study.

The possibilities of the telephone which Alexander Graham Bell had but recently invented so strongly appealed to his imagination that he sought an opportunity to participate in the development of this new marvel. In 1879 he entered the service of the Bell Telephone Company in Boston and, with the exception of a period of service in the United States Army during the World War, was active in its councils until his retirement on June 30, 1930.

It is difficult, if not impossible, now to visualize the conditions under which the telephone pioneers operated. Man had yet to acquire much of the scientific knowledge he possesses today; there were no schools of electrical engineering to provide trained personnel; primary batteries and magneto generators were the only sources of electrical energy; and adequate theories of the transmission of such energy over wires had not been formulated.

The story of General Carty's life is the story of the technical development of the telephone, not only in the United States but throughout the whole world. His own contributions were notable. He designed and installed the first multiple switchboard, which featured common battery signaling, and later showed how to operate two or more telephone transmitters from a single central battery. These features, foundations of the present common battery system essential to every large telephone switchboard, made practical the commercial development of the telephone in metropolitan areas.

From the beginning of the telephone business, induction between closely adjacent circuits had to be prevented, so that speech transmitted in one could not be overheard in another. Closely related was the task of minimizing electrical disturbances from other sources. When but little was known on this subject, he carried out an im-

portant scientific investigation which made it possible to correctly handle wire transpositions and laid the foundation for holding inductive disturbances within limits that permitted the full development of the industry.

In early telephone systems the instruments, including signaling devices, were placed in series in the line. This arrangement with several instruments on the same line impaired telephone transmission seriously and interfered with satisfactory signaling. General Carty concluded from a study of this question that instruments should and could be placed in parallel if correctly designed with high impedance signaling apparatus. This arrangement removed a serious limitation to the development of the business, and made the party line and the rural line a possibility.

After his early experience in the design, construction, and operation of telephone systems in and around Boston and later with the Western Electric Company in New York City, he became in 1889 Chief Engineer of the New York Telephone Company. In that position he was responsible for the company's technical problems in the city which is telephonically the largest in the world. He built up an engineering staff and was the first among the operating executives to recruit technical personnel from the graduates of scientific and engineering schools.

In 1907, he became Chief Engineer of the American Telephone and Telegraph Company. His first task in this position was to reorganize the technical forces of the Bell System. He consolidated the laboratories that were located in Boston, New York and Chicago into what later became the Bell Telephone Laboratories in New York.

To talk across the continent from the Atlantic to the Pacific was the boyhood dream of General Carty and his early associates, and he now had the opportunity of leading a distinguished group of scientists and engineers in an attack upon this problem. It was solved on January 25, 1915, when the New York-San Francisco line was opened to public service. Through the application of the methods employed, telephone service was later extended to every State of the Union, and to Canada, Cuba and Mexico as well.

General Carty inspired and directed the work which resulted on October 21, 1915 in transmitting the first articulate words across the

Atlantic Ocean by radio telephony from the United States Naval Station at Arlington, Virginia to the Eiffel Tower in Paris. This work continued, until today the barrier of the Atlantic Ocean has been overcome and commercial telephone service between the old world and the new is a daily fact.

At the outbreak of the World War, he was ordered to active duty as a Major in the Signal Corps of the United States Army. In 1918, he was promoted to Colonel and ordered to France, where he served on the staff of the Chief Signal Officer, and later was promoted to the rank of Brigadier General in the United States Army Reserve Corps. For his services as an officer in the United States Army, he received the Cross of the Legion of Honor from France and the Distinguished Service Medal from the United States.

Upon his return to the United States in 1919, he became a Vice President of the American Telephone and Telegraph Company and, with the incorporation of Bell Telephone Laboratories in 1925, he became Chairman of its Board of Directors.

General Carty was a member of the National Academy of Sciences and an honorary member of the Franklin Institute, which Society bestowed upon him the Franklin and Edward Longstreth Medals. The American Institute of Electrical Engineers, of which he was President during 1915-1916, awarded him the Edison Medal in 1917. The United Engineering Society awarded him in 1927 the John Fritz Gold Medal "for pioneer achievement in telephone engineering and in the development of scientific research in the telephone art." For his services in connection with Japanese electrical communications, he received from that government the decorations of the Order of the Rising Sun and the Order of the Sacred Treasure.

Stevens Institute of Technology and New York University granted to General Carty the degree of Doctor of Engineering. From Chicago, Bowdoin, Tufts, Yale and Princeton, he received the degree of Doctor of Science, and from McGill and the University of Pennsylvania the degree of Doctor of Laws.

In August, 1930, the American Telephone and Telegraph Company established, under the custody of the National Academy of Sciences, the John J. Carty Medal for outstanding achievement in science in honor of General Carty's noteworthy contributions to the advance-

ment of fundamental and applied science and in appreciation of his great service in the development of electrical communication. Shortly before General Carty's death, the National Academy of Sciences selected General Carty as the first recipient of this Medal. The presentation was made posthumously on April 25, 1933 in Washington at the annual meeting of the Academy.

FRANK B. JEWETT.

EDWARD CHANNING (1856-1931).

Fellow in Class III, Section 3, 1911.

Edward Channing was born in Dorchester, Massachusetts, June 15, 1856, the fifth child of the poet Ellery and his wife Ellen (Fuller) Channing. He was brought up by his grandfather, Dr. Walter Channing, in Boston and Brookline, entered Harvard College in 1874, and took his first degree in 1878. While in college, he became interested in history by Henry Adams, and decided to make that subject his life work. In 1880 he took his Ph.D., writing his dissertation on the Louisiana Purchase. After a year of travel in Europe, Dr. Channing returned to Cambridge and for two years supported himself by writing articles and book reviews. In the fall of 1883 he was appointed instructor in History, and from that year to his death he was a member of the Harvard Faculty, being promoted in the usual course to Assistant Professor and Professor. At first Dr. Channing taught all branches of medieval and modern history, as well as government and international law. After becoming full professor in 1897, he was able to concentrate on his favorite branch of American History. During all this period, he was actively engaged in writing, his prize essay on *Town and County Government in the English Colonies* (1884) having given him scholarly reputation and created a demand for his contributions. As early as his junior year in college, Channing determined to write a history of the United States from the beginning to our own day; but it was not until 1897, when he became a full professor, that he had sufficient relief from teaching and from writing of a pot-boiling nature, to give him time actively to prosecute this great design.

The first volume of his *History of the United States* came out in

1905; the sixth and last, covering the Civil War, in 1925. A seventh on the period from 1865 to 1900 was partly completed at the time of his death on January 7, 1931. Although his *History of the United States* will probably remain his chief monument for posterity, Professor Channing performed a no less useful purpose in his teaching. He was a successful teacher both of undergraduates and post-graduate students; hundreds of the latter were trained in his famous seminar, History 23, which moved forward with his *History of the United States* from the Northmen to McKinley.

S. E. MORISON.

JOSEPH HODGES CHOATE (1832-1917).

Fellow in Class III, Section 1, 1900.

Joseph Hodges Choate was born in Salem, January 24, 1832. He graduated from Harvard College in 1852 and was bachelor of laws of the Harvard Law School in 1854. He received the degree of doctor of laws from Amherst, Harvard, Cambridge (England), Edinburgh, Yale, St. Andrews, Glasgow, Williams, Pennsylvania, Union, Magill, Toronto, and of D.C.L. from Oxford. He was the president of the New York Constitutional Convention in 1894, was ambassador to Great Britain in 1899-1905. He had been president of the Harvard Chapter of Phi Beta Kappa, president of the Harvard Alumni Association, of the Law School Association and of the American Bar Association.

These records of achievement are records of his less characteristic activities. He was over and above all a great advocate. For the last half of his life he was distinctly the head of the American Bar so far as the actual trial of cases was concerned. His kindness and humor, his great intelligence and his knowledge of men together with the professional sense which he derived from a race of lawyers made him eminent as a jury lawyer; not that his arguments on points of law were undistinguished, for he argued and won some of the most important cases of his time before the Supreme Court of the United States. He was elected a non-resident Fellow in January 1900.

J. H. BEALE.

FRANK SHIPLEY COLLINS (1848-1920).¹

Fellow in Class II, Section 2, 1901.

Frank Shipley Collins was born in Boston, Mass., February 6, 1848. He was the son of Joshua Cobb Collins and Elizabeth Ann (Carter) Collins. Both the Cobb and the Collins families were old colonial families of the Cape Cod Peninsula, while the Carters were of similar stock of Charlestown, Mass. The mother of Frank Shipley Collins and her two sisters were teachers, teaching English, Greek, Latin, French, mathematics, and botany in the Charlestown Female Seminary. Frank, being a delicate child, was first taught at home, and having lost his father very early in life and the rest of the family having removed to Malden, he attended first a very exclusive private school there and later the public schools, from which he was graduated with honors in all his subjects. He completed his formal public education on graduating from the high school of Malden in his sixteenth year (1863). The principal influences in his training were his home studies and these were continued for two years after he finished school, while suffering from severe attacks of asthma. During these years he was able, however, also to study harmony and the pianoforte, and under a talented teacher, a man of ability and charming personality, one who had traveled much, he was introduced to attendance on public recitals, concerts, opera, etc., of the highest type. This interest continued throughout his life and he was a constant attendant on the performances of the Boston Symphony Orchestra, of chamber music, and of virtuosi. It was the ardent desire of his mother and his aunts that he enter Harvard University, but his grandfather Carter, whose means at that time were amply sufficient, but who was a man of severe, practical ideas, decided upon a business career. Finally, after various disappointing experiences, the family means having in the meantime greatly diminished, qualified as an expert bookkeeper, he entered the employ of the Malden Rubber Shoe Company, as ticket clerk. Here his attention was directed to the problems presented by the system of laying out the separate pieces of boots and shoes to be made up into the finished product. He

¹ Compare biography by W. A. Setchell, *Amer. Jour. Bot.*, 12: 54-62, Jan. 1925, with portrait and bibliography.

was eminently successful in administering and improving these fundamental processes and continued with this same firm (under its various reorganizations), as manager, for over thirty years, until his retirement. Shortly after that, however, he was recalled by the exigencies of the World War to become efficiency expert at various plants of the company, and his death, after a brief illness, at New Haven, Connecticut, on May 25, 1920, found him still occupied along these lines.

In 1875, Collins married Anna Lendrum Holmes of Little Falls, New York, a lady of congenial tastes, especially in art and music, who, with the two sons born of the marriage, survived him. Through his wife he became acquainted with Mrs. Maria H. Bray, at Magnolia, Mass., who, because of the cards of named and mounted "Sea Mosses" she sold at her "Ptilota Café," was the direct instrument of attracting his attention to the marine algae of New England. These soon became his principal life interest and raised him to high rank as an authority on the subject.

Collins evidently absorbed the elements of botany from one of his maternal aunts, Mrs. Simon G. Shipley, and this was increased by his association with the members of the Middlesex Scientific Field Club and the Middlesex Institute (incorporated, 1881), especially with L. L. Dame, Walter Deane, C. E. and Edwin Faxon, G. E. Davenport, Clara E. Cummings, and W. G. Farlow. There resulted the "Flora of Middlesex County, Massachusetts," by Dame and Collins, published by the Middlesex Institute, in 1888.

Collins was a business man and during office hours was fully occupied. His unoccupied (leisure?) hours and his short vacation periods were devoted to study, whether of music, art, or science. Nevertheless, his systematic application and tireless energy led him far in several fields and the tangible results are many. His list of published works and articles amounts to close upon 100 titles, the great majority being concerned more or less directly with the algae, and particularly with the marine algae. Beginning in 1880, his notes and monographs followed one another in constant and logical succession. W. G. Farlow, in the first impression of his "Marine Algae of New England (1881)," mentions Collins as one of those to whom he was especially obligated. The publication of Farlow's

manual was a great incentive to a serious-minded and progressive amateur like Collins. The New England coast became his especial hunting ground and in his later years, when it was hoped, both by Farlow and others, that he would complete a new edition, or rather substitute for it, he had more than doubled the original content of its known species. Unfortunately, the amplified account of the marine algae of New England never came to definite form.

While Collins was preeminently a regional phycologist, yet his interests and experience went far beyond this, extending particularly throughout the Atlantic coasts of North America and even to the Pacific coasts. In company with Rev. A. B. Hervey, he explored and made known the marine flora of the Bermuda Islands (1917); from extensive collections of various collectors he did the same for the island of Jamaica (1901); for Vancouver Island (1913); as well as the blue-green algae of the Bahama Islands (1920). In a monographic fashion, Collins elaborated reports on the green algae; first on the marine *Cladophoras* of New England (1901); second, on the *Ulvaceae* (or Sea-Lettuces) of North America (1903); and finally on the green algae of North America as a whole, both marine and fresh water (1909, and supplements 1912 and 1918).

As a collector and assembler of algal material, Collins had few equals. His herbarium was rich in specimens of his own and of others' collecting and received from other and particularly from authoritative workers. After his death it was purchased by Dr. N. L. Britton and presented to the New York Botanical Garden. One of the important works carried through by Collins was the issue of some 51 fascicles (of 35 to 50 numbers each) of the *Phycotheca Boreali-Americana* (1895-1919), containing 2300 numbers of smaller and 125 numbers of larger mounted specimens of North American algae. While this was done in collaboration with Isaac Holden and W. A. Setchell, the burden of correspondence, assembling, printing, and issue, involving at least 200,000 specimens, fell upon Collins and was so admirably carried through that this collection is basic to all future study of North American Algae.

Collins was in active consultation, personal or by correspondence, with all of the active phycologists of his time, and was especially in sympathetic relations with W. G. Farlow. He was a member of

the Middlesex Institute, of the Boston Society of Natural History, of the Massachusetts Horticultural Society, of the New England Botanical Society (president for three years), corresponding member of the Torrey Botanical Club, and long a member of this Academy. He received the degree of M. A. (*honoris causa*) from Tufts College in 1910, and was appointed an Associate in the University Museum of Harvard University. His memory will be perpetuated by the members of the genus *Collinsiella* (Setchell and Gardner) and particularly by his most interesting namesake, *Phaeosaccion Collinsii* Farlow.

Frank Shipley Collins was a slender man, of medium height, early gray, but with youthful appearance, roundish face, with broad mustache; he was the more resembling (although not closely) the Mark Twain than the James Russell Lowell type. He was strictly the amateur, in that his vocation was far from phycology, but in his accomplishment he carried through the critical and thorough methods of the most accomplished professional. He was kindly towards the errors and shortcomings of others, generous in sympathy and substantial aid to his fellow workers, a friend of enduring loyalty, and ardent in his pursuit of knowledge. He represents a type of scholar of whom the community which possessed him as a member may well be proud.

WILLIAM ALBERT SETCHELL.

ARTHUR MESSINGER COMEY¹ (1861-1933).

Fellow in Class I, Section 3, 1891.

Arthur M. Comey was distinguished as a teacher, author, and director of a large and important industrial research laboratory. His personality and interests outside the field of chemistry attracted to him many friends. His retirement from active work made it possible for him to enjoy for over ten years the pursuit of the things that were always dear to him. He played the piano and the flute, was a skillful amateur photographer and gardener, a great walker, and an experienced woodsman.

¹ An appreciation of Dr. Comey and his work written by Charles L. Reese was published in "Industrial and Engineering Chemistry," 20, 438 (1928).

Doctor Comey was born in Boston, November 10, 1861, and came from old New England stock. He was graduated from Harvard in 1882 and went to Germany to continue the study of chemistry. He worked with Victor Meyer at Zurich and received his doctorate from Heidelberg in 1885. He was immediately appointed to an instructorship at Harvard where he organized and served as director of the summer school of chemistry. In 1889 he became professor of chemistry at Tufts College and resigned four years later to take up literary and consulting work. In connection with the latter he showed the folly of the attempt to extract gold from sea water. He spent a summer at Marblehead on this work and succeeded in securing a bead of gold large enough to be seen under a microscope.

The first edition of Dr. Comey's Dictionary of Chemical Solubilities was issued in 1896, and a second edition in 1921. This book continues to be a standard work of reference.

From 1906 to 1919 Dr. Comey was director of the explosive laboratory of the DuPont Company. It is probable that his most important invention was an improved process for the manufacture of dynamite based on the nitration of a mixture of sugar and glycerine. The method brought about much economy in the manufacture of explosives and yielded a product safer to handle. Dr. Comey retired in 1921. He spent his winters in Cambridge and his summers at his beautiful home on Lake Chocorua, New Hampshire. He died on April 6, 1933.

Dr. Comey took an active part in the affairs of the American Chemical Society. During the World War he was chairman of the Sub-Committee on Explosives of the National Research Council.

JAMES F. NORRIS.

LESLIE COLBY CORNISH (1854-1925).

Fellow in Class III, Section 1, 1923.

The descendant of Maine ancestry, Leslie Colby Cornish was born in Winslow in that state on October 8, 1854, and died on June 24, 1925. He attended a district school in his native town, then the Waterville Classical Institute, now the Coburn Classical Institute, and graduated at Colby University, now Colby College, in 1875

before reaching his majority. After teaching for two years and studying for a time in an office, he spent one year at the Harvard Law School and was admitted to the bar in 1880. His residence for the rest of his life was in Augusta. There he practiced law with steadily increasing distinction until he went on the bench. He was married in 1883 to Fannie Woodman Holmes, whom he survived but a comparatively short time. He was a member of the House of Representatives of his state for a single term and served in the common council and board of aldermen of his adopted city. He was a member of the state board of bar examiners and also trustee and president of the Augusta Savings Bank. He was a trustee of Colby College from 1888 and president of the board from 1904 until his death. He was a director of the American Unitarian Association and a president of the Maine Unitarian Association. In 1907, he was appointed a justice of the Supreme Judicial Court of his state and became its twelfth Chief Justice in 1917, a trust which ill health compelled him to resign in March, 1925. He was deservedly held in high esteem as a prompt and efficient magistrate in presiding over jury trials and in promoting just results. He was on the bench more than sixteen years and wrote three hundred and forty-four opinions expressive of the judgment of the court, found in volumes 103 to 124 of the Maine Reports. His style was simple and lucid, a garment fitting for clear thinking and ample learning. He made substantial contributions to the growth of jurisprudence. He was highly regarded by the bench and bar of his state. He possessed the characteristics which should accompany high judicial station, intellectual and moral power, industry, energy, learning, evenness of temper, the spirit of justice. He was recognized widely outside his native state as an able and just judge. In one of the recurring periods of complaint over the law's delay, he wrote a convincing and sparkling article on the "Law's Dispatch" as illustrated by the practice of Maine. He was the recipient of the honorary degree of LL.D. from Colby and Bowdoin, and the University of Maine. He was elected a fellow of this Academy on May 9, 1923. Endowed with a melodious voice and a ready wit, he was a public speaker of unusual grace and force. Somewhat above the average height, he was erect of figure and dignified in bearing, an impressive personage on any occasion and in any company.

Culture and refinement, strength and good will were expressed in his appearance. Attributes of heart and mind endeared him deeply to many friends. He was rich in the human qualities and in the intellectual achievements which mark a man for large usefulness and wide influence in the promotion of the public welfare.

ARTHUR P. RUGG.

CHARLES AMBROSE DeCOURCY (1857-1924).

Fellow in Class III, Section 1, 1924.

Charles Ambrose DeCourcy was born in Lawrence, Massachusetts, on September 23, 1857, and died in New London, New Hampshire, on August 22, 1924. He was the son of parents who emigrated to this country from Kinsale in southern Ireland. He attended the public schools of his native city and was graduated at Georgetown University in 1878 and at the law school of Boston University in 1880. He practiced his profession in Lawrence. He was assistant district attorney for the Eastern District comprising Essex County for six years beginning in 1884, and was city solicitor of Lawrence in 1892. By ability, industry and energy he became a leader of the bar. He was married in 1886 to Elizabeth M. Roberts, who with two sons, Harold and John, survived him. In 1902, at the age of forty-four, he was appointed a judge of the Superior Court by Governor Crane. He achieved a high degree of success as a trial judge. Although experienced in every branch of the law, he was deeply interested in the development and extension of the probation system in the administration of criminal law, and regarded it as susceptible of becoming a highly effective method in solving the problem of crime. By his own constructive efforts and wise counsel he made signal contribution to this aspect of the public welfare. In 1911, with general professional and public approbation, he was appointed by Governor Foss a justice of the Supreme Judicial Court. His service on this court covered a period of about thirteen years. He wrote seven hundred and eighteen opinions expressive of the judgment of the court, to be found in thirty-nine volumes of the reports of its decisions from 210 Mass. to 249 Mass., both inclusive. His opinions possess a distinctive excellence. They are brief but adequate,

characterized by clarity of thought, thorough investigation and mature consideration of underlying principles. The lucidity of his style was marked by rare literary finish. He performed his judicial work with ardent enthusiasm and all his might in the consuming aspiration that he be worthy of his great trust. His tastes were scholarly. He had a keen aptitude for public speaking. His melodious voice was carefully cultivated to this end. He was elected a Fellow of the Academy on May 14, 1924. The honorary degree of LL.D. was conferred upon him by Georgetown University in 1904. He was a vice president of the American Institute of Criminal Law and Criminology, a chairman of the committee on criminal law of the American Prison Association, and president of the Massachusetts State Conference on Charities. He was one of the Board of Regents of Georgetown University and a visitor in the Department of Philosophy at Harvard University. He had rare personal charm. In manner he was animated, winsome, attractive. By nature and by practice he was religious, and he was strictly observant of the rites of his church. He was delightful in conversation and companionship, with sparkling and kindly humor. Lover of the classics, widely read in poetry, literature and history, he was on terms of friendship with large numbers of people of quite varied accomplishments. His life enriched the civic life and the judicial annals of the Commonwealth.

ARTHUR P. RUGG.

ALBERT VENN DICEY (1835-1922).

Foreign Honorary Member in Class III, Section 1, 1901.

Albert Venn Dicey was born February 4, 1835. He was educated at Oxford where he graduated first class in 1858. Entering the Bar he got immediate employment as a junior and soon became junior counsel to the Inland Revenue. In 1882 he became Vinerian Professor of the Common Law at Oxford and remained such until his resignation in 1907. He died April 7, 1922, at the age of 87 years. He was one of the founders of the *English Law Quarterly Review* and a frequent writer in its columns. In the year 1897 he delivered a series of lectures before the Harvard Law School which were published as "Law and Public Opinion in the 19th Century."

Professor Dicey was the author of a number of important and well-written law books of which the principal was his *Conflict of Laws*, the first edition of which was issued in 1896. He was a sound lawyer, an accomplished advocate and a clear writer. Few men in England have surpassed him as a legal author. He was elected a Foreign Honorary Member in March 1901.

J. H. BEALE.

CHARLES LEAVITT EDGAR (1860-1932).

Fellow in Class I, Section 4, 1924.

Charles L. Edgar was born December 23, 1860, at Griggstown, N. J., the son of Thomas and Annie Veghte Edgar, of Scottish and Dutch colonial ancestry.

His early education was in the district schools of Middlesex County, N. J. His summer vacations from 1875 to 1880 were spent on his uncle's farm near Menlo Park, N. J., where the great American inventor, Thomas A. Edison, had his laboratory, and where the incandescent electric lamp was being successfully developed. As a justice of the peace, his uncle paid frequent professional visits to Menlo Park in connection with Mr. Edison's patent applications. Young Edgar came into contact there with Mr. Edison, which changed the course and direction of his life. The inventor's enthusiasm, energy, and kindly zeal inflamed Edgar's aspirations, as indeed they did those of many other young men of that period.

After a short preliminary course at the Rutgers Preparatory School, Edgar entered Rutgers College, N. J., in 1878, and graduated four years later with the degree of B.A. He then continued with a short post-graduate course in applied electricity, which was, at that time, a rapidly advancing subject.

Early in January 1883, Mr. Edgar left Rutgers, armed with a letter of recommendation from the Dean, and went in search of employment, to call at Menlo Park on Mr. Edison, whom he had not seen for four years. Mr. Edison was well pleased with the interview, and gave him a letter to the manager of the Edison Electric Light Co., in New York City. This was shortly after the start of

the first Edison incandescent lighting station at Pearl St., in downtown New York City.

Mr. Edgar entered the service of the Edison Companies forthwith, and took an active share in starting and operating Edison lighting and power systems in a number of towns and cities. In September 1887, he was sent to Boston as manager of the Edison Electric Illuminating Co.'s station in that city. He remained in Boston, devoted to the service of that company, until his death in 1932. In 1889, he was promoted to be general manager of the Boston Company; in 1891, he was elected a director; in 1892, he became vice-president; and in 1900, Mr. Edgar became president of the company, holding that position until the last.

When he was manager of the station in 1887, the number of its customers, using electric light service in Boston, was 260, in a territory not exceeding 30 hectares (0.11 sq. mile). In 1932, the number of customers had risen to more than 400,000 over an area of more than 1680 sq. km. (650 sq. miles).

Edgar's outstanding characteristics were unflagging industry, calm judgment, executive ability, and unfailing courtesy. He won the affection of all his subordinates and the esteem of all those with whom he came in contact by his honesty and fair dealing. He was a great admirer of Mr. Edison, and a close student of the business of electric light and power distribution, based on scientific principles. The new lighting stations, that he successively built, were all models at their respective dates of installation. The high standard of electric lighting service in Boston is largely the result of his work.

In 1927, Mr. Edgar received the honorary degrees of Sc.D. from his alma mater, Rutgers College, and of LL.D. from Tufts College. He was elected to membership in the American Academy of Arts and Sciences in 1924. Dr. Edgar was a director or trustee in many New England organizations, and was the first chairman of the Boston Section of the American Institute of Electrical Engineers.

He died April 14, 1932, six months after the death of his beloved leader, Thomas A. Edison. The friendship between these two remained to the end a source of mutual comfort.

Dr. Edgar is survived by his widow, Mrs. Annette Duclos Edgar, and by his son, Leavitt L. Edgar.

A. E. KENNELLY.

BENJAMIN KENDALL EMERSON (1843-1932).

Fellow in Class II, Section 1, 1895.

Born in Nashua, N. H. December 20, 1843, died at Amherst, Massachusetts, April 7, 1932, nearly ninety years old.

One of the most distinguished geologists of the United States,—the main facts of his life (society memberships and offices held) are given in *Who's Who*, Volume XI, 1920-21, and in the memorial by F. B. Loomis (Bulletin Geological Society of America, Volume 44, p. 317). He was reported to have been killed in a railroad accident in 1893 and the *Springfield Republican* published his obituary and a tribute of which he remarked, "It will be a job to live up to it." But the collision left him more robust. In the Amherst Graduates' Quarterly for August 1932, p. 259-265, Horatio Smith describes *Professor Emerson, the Man*. In the class notice in the same number, p. 282, is an account of his honors and achievements.

For over 50 years he taught geology at Amherst College, and Loomis lists 17 distinguished geologists who were his pupils. It was not therefore surprising that the Geological Society of America of which he had been President and many times officer and toastmaster presented him with a loving cup on his retirement in 1924-5. His writings are mainly given in the memorial by Loomis. But his Göttingen Ph.D. thesis is omitted:—"Die Liasmulde von Markoldendorf bei Einbeck."

He was recognized to be the best of his time in all around acquaintance with the geology of Massachusetts and his U. S. G. S. Bulletin 597 has not been replaced.

Though he used the microscope Professor Emerson was a keen field observer. He first called my attention to the puckered appearance around allanite which characterizes the radio-active minerals.

Characteristic in more than one way is the story that he hired a horse for a geological trip, and leaving the horse hitched while he followed the geology across field and dale, finally walked home, forgetting the horse which the livery man had to retrieve.

My most vivid recollection of the first dinner of the Geological Society that I attended was of him as toastmaster. His wit lasted to the end. No one who heard it will forget the shout at the dinner

at which he was given the loving cup. John M. Clarke had been saying how much he appreciated Emerson's course and had never cut. Then Kemp (for whom he prepared the Academy memorial) presented his compliments but owned that he could not say as much. At which Emerson broke in with that deep voice "Why not? Clarke said it."

There are many such stories of which Smith preserves a few. Some of his absent-mindedness may have been deliberate for he was not above "spoofing." See the stories on p. 262. One I like, not mentioned, is the dialogue with the student conditioned in mineralogy set down before a tray.

"It seems to me, Professor, that we would get along faster if you'd lecture."

"Young man, I believe your major subject is philosophy?"

Yes, he had done well in philosophy. He liked it better than science.

"Did you take the course in Psychology?"

Yes, he had a good mark in Psychology.

"Did the professor of Psychology tell you about the theory of grooves in the brain?"

Yes, he remembered well that interesting theory of the association of ideas and the repetition of experiences producing grooves in the brain.

"Yes? Well, did the Professor tell you that the deepest groove in a sophomore's brain is from one ear to the other?"

Like all geologists he loved to travel and was a circumnavigator. Wherever he went he was a welcome and delightful guest. His grandchildren had a little chant:

"When I was in Russia
With my little hammer
And dined with the Czar. . ."

In print his jokes might sound rasping. But in life it was clear that they were fun.

Professor Emerson was of an old and distinguished New England family with many collateral relatives known in educational and diplomatic circles, and the sturdiness of the stock showed in that when he died he had eight surviving children and twelve grandchildren,

having lost none by death. It was well said that he was "characterized by vigor and serenity," one may add by keenness of insight and wit in expression, good nature and optimism in spirit. No wonder he was an inspiring teacher.

ALFRED C. LANE.

WILLIAM WALLACE FENN (1862-1932).

Fellow in Class IV, Section 1, 1909.

William Wallace Fenn, born in Boston, February 12, 1862, died in Cambridge, March 6, 1932, was the son of William Wallace and Hannah Morrill (Osgood) Fenn. His father died when he was seven weeks old, but his mother with rare courage managed to keep her home in Boston and give her only child the educational advantages of the city. He attended the public schools, prepared for college at the Boston Latin School, leading his class, graduated from Harvard in 1884, *summa cum laude*, and from the Harvard Divinity School in 1887. He accepted a call to Unity Church, Pittsfield, Massachusetts, where he met and married Faith Huntington Fisher, in 1891. From 1891 to 1901 he was minister of the First Unitarian Society of Chicago, Illinois; and in 1901 he was appointed Bussey Professor of Theology in Harvard Divinity School, a position which he held until his death.

Upon graduation from the Divinity School he received the M.A. degree in recognition of his high standing; and in 1908 he received the S.T.D. degree from Harvard. He was a member of the Phi Beta Kappa Society. He served two terms as College Preacher, 1896-1898 and 1902-1905. From 1906 to 1922 he was Dean of the Harvard Divinity School Faculty. For almost thirty-two years he held his professorship, taking but one half of one sabbatical and rarely missing a lecture. His last illness was mercifully brief; four days after the lecture that was destined to be his last he was gone. He became a Fellow of the American Academy of Arts and Sciences in 1909.

A lively human interest coupled with unusual intellectual power made him an illuminating teacher. His school-boy passion for the classics developed into a special interest in New Testament Greek, and at one time it was his dream to teach the New Testament in

some divinity school. Throughout his own divinity school career he had assisted Professor Joseph Henry Thayer in the preparation of the "Greek-English Lexicon of the New Testament,"—an exceedingly profitable experience. With his appointment to the Chair of Theology came the necessity of transferring his interests to a new field. No one realized better than himself that Dean Everett's shoes would be pretty big ones for him to fill. Modest and conscientious to the last degree, he threw himself with the utmost assiduity into his new work, and before many months won the place he will ever hold in the hearts of his colleagues and pupils,—one of the most thorough scholars and one of the most quickening teachers the Harvard Divinity School has ever boasted.

He found an especially congenial field in the New England Theology, and became the foremost authority in that subject. A thorough New Englander himself, he insinuated his sympathy into the intricacies of the New England Theology in a way to make that whole tortuous fabric of thought live again. Probably no man of his generation knew as much as he about the church polity, the customs, and the literature of New England Puritanism.

He steadfastly refused to write and publish a book. Many sermons and addresses were issued in pamphlet form or as articles in various periodicals. Could these be collected, they would make several imposing volumes, but even these lapses into print he "viewed with alarm." When asked why he was so determined not to publish, his favorite retort was "I have not yet stopped thinking." And as the desolating implications of that reply sank into the hearer's mind, he would throw back his head and indulge in a hearty laugh. No man ever treated books with truer discrimination. There was no trace of false reverence for printer's ink, as such. A worthy book received from him instant and grateful appreciation. But in too many instances, the appearance of a book seemed to him to synchronize with a stoppage in its author's thought processes, and he had no intention of adding to that number. Yet to hundreds who came under his influence, what a treasure a book from his pen would be!

He was very reticent, very reserved, and exceedingly sensitive. His friendship was not easily won; once it was won, it could never be lost. Young men he loved, and they always had quick access to his

heart. With all his power of intellect, he was as free from intellectual snobbery as one could be. Among his most intimate friends were those who could never hope to give him intellectual companionship. And he revealed the breadth and balance of his judgment when he remarked once of a favorite of his, "No, he will never set the world on fire; but, thank the Lord, he will never do a mean thing."

CHARLES E. PARK.

FREDERICK PERRY FISH (1855-1930).

Fellow in Class III, Section 1, 1913.

Born in Taunton, Massachusetts, January 13, 1855; died in Brookline, Massachusetts, November 6, 1930. His early education was obtained in the public schools of Taunton; he entered Harvard College from the Taunton High School, received his bachelor's degree with the Class of 1875, then entered the Harvard Law School, leaving that school in 1876 to enter into active practice in the offices of Col. Thomas L. Livermore and former U. S. Senator for New Hampshire, Bainbridge Wadleigh, in Boston.

The law firms with which Mr. Fish was connected were, in succession, Wadleigh and Fish; Wadleigh, Fish and Wellman; Livermore and Fish; Livermore, Fish and Richardson; Fish, Richardson and Storrow; Fish, Richardson, Storrow and Herrick; Fish, Richardson and Herrick; Fish, Richardson, Herrick and Neave; and Fish, Richardson and Neave.

Mr. Fish's practice during substantially the whole of his professional life, was mainly in patent cases. This period was one in which the industries of the United States were rapidly expanding under the stimulus of invention and discovery in every department. In nearly all the patent cases of primary importance during his forty years of active practice Mr. Fish appeared as counsel. These cases comprised patents relating to the telephone, air-brakes, the steam turbine, automobiles, shoe machinery, radio-apparatus; Mr. Fish's industry, intelligence, and versatility mastered the technique of them all; he was recognized by the Federal Courts in all parts of this country as a master-advocate and became the acknowledged leader of the American Bar in patent causes.

In the mastery and solution of problems of business, Mr. Fish also manifested abilities of the highest order, and, as general counsel of the Thomson-Houston Electric Company, and, later, of the General Electric Company, he performed an influential and directive part in the development and organization of the electric lighting industry in the eighties.

In July, 1901, Mr. Fish was made president of the American Telephone and Telegraph Company, and held that position for six years, during which time he infused into the Company's personnel his own enthusiasm and his conviction that the full success of the telephone industry depended on national service by a national organization. Under his leadership, the Telephone Company practically completed and unified the vast network of telephone lines which now reaches into every part of the country.

The larger diversity of interests afforded by patent law practice drew Mr. Fish back to his law firm, which he rejoined in 1907. His mind and energy were such as not to be satisfied with a single task, however great it might be. This reason, which led to his resignation of the presidency of the American Telephone and Telegraph Company, also determined his refusal of the presidency of the Massachusetts Institute of Technology.

Mr. Fish served as Vice-President of the Bar Association of the City of Boston from 1909 to 1920 and as President of the Massachusetts State Bar Association for the year 1919-1920.

Mr. Fish possessed a tremendous vitality, an active and creative imagination, and an extraordinarily tenacious memory. He never remitted his work of self-education. His knowledge of the arts, sciences, history and literature was as nearly complete as possible for a man of his age and generation.

He was actively interested also, in the cause of education for others. For years he served as a member of the Corporation of the Massachusetts Institute of Technology, of the Governing Board of Radcliffe College, of the Board of Overseers of Harvard College. He was a trustee of the American School of Classical Studies in Athens, and Chairman of the Massachusetts State Board of Education. In all these positions he gave unstintingly of his labor and counsel.

In 1916 he founded the National Industrial Conference Board, which has comprised the leading industrial figures of this country.

In his seventy-fifth year, Harvard College conferred on Mr. Fish the honorary LL.D. President Lowell said of him, on that occasion:

"Leading patent lawyer of the country, who, amid the work of an exacting profession, has wrung time for public service in directing education."

Frederick P. Fish was a broad scholar, a great barrister, a public spirited citizen, a generous-minded and warm-hearted man.

ODIN ROBERTS.

JOHN WILKES HAMMOND (1837-1922).

Fellow in Class III, Section 1, 1914.

John Wilkes Hammond was made a Fellow of the American Academy of Arts and Sciences on May 13, 1914, in Class III, Section 1.

His Fellowship was well earned. His career fully sustained the wisdom of his election. His ancestors came early to Plymouth Colony, thence to Massachusetts Bay. William Hammond, the father of the first Hammond to settle here, married a sister of Admiral Sir W. Penn, an aunt of the William Penn who founded Pennsylvania. An ancestor on his mother's side, Constance Southworth, was born in Leyden, Holland, in 1615. For this we have the authority of Attorney General Benton and a committee of the Bar in 1923. Ancestors on both sides had been persons held in high respect in their communities. Born in Mattapoisett on December 16, 1837, his father's death left him, when five years old, to the care of his mother, the daughter of the village physician. Educated by life in the country village, by its public schools, and by what he called "the one educational institution of the town—Harlow & LaBaron's store," he entered Tufts College, and took its degree of Bachelor of Arts in 1861, graduating at the head of his class. Then, after teaching school at Stoughton and Tisbury, he enlisted and served as private in the third regiment of Massachusetts Volunteers in the Civil War, until mustered out in June of 1863. For a time he taught in high schools at Wakefield and Melrose. Then, in 1865, he entered the Harvard Law School where he took his degree of LL.B. in 1866.

Admitted to the bar in 1866, after taking his law degree and after having had practical training since 1864 in the law office of Sweetser & Gardner, he opened an office in East Cambridge. Later he moved the office to Cambridgeport and to Boston. Business came to him. In 1873 he was made City Solicitor of Cambridge, an office which he held, and adorned, until his appointment to the bench of the Superior Court in March, 1886. For a short time in 1879—to fill a vacant term—he was, by appointment, district attorney of the northern district. He served Cambridge in its common council, as its representative in The Great and General Court in 1872 and 1873, and upon its school committee. He served Tufts College as one of its Board of Trustees. From March, 1886, until Governor Wolcott, on September 7, 1898, appointed him an Associate Justice of the Supreme Judicial Court, he rendered exceptional service to the Commonwealth as a Judge of the Superior Court. Lawyers loved to try before him. Jurors remembered their terms of service with joy and pleasant recollections of witty sayings; dignified handling of trial problems; shrewd suggestions in puzzling situations; wise, sensible, helpful charges that yet never took from them their sense of personal responsibility for the proper verdict. Parties left the court room satisfied that they had had an impartial trial guided by sound rulings of law from a judge wise, not only from the books, but from sound common sense and broad human understanding.

His service on the Supreme Judicial Court added to his reputation. His opinions are clear, accurate and expressed in English written as only few can write. Several of them are likely to stand as landmarks of the law to which they relate. His colleagues found him as helpful as he was delightful in the work of the Court over the consultation table. His work, like that of most judges, is of greatest value in the parts least open to the eyes of the people. But the people generally did trust, honor and believe in him. Tufts, in 1891, and Harvard, in 1911, conferred on him their degrees of LL.D. He was no ascetic. He loved society. He played chess. He played golf. He greatly loved to watch a base ball game, and he attended league games whenever he could. He was loved by wife, children, and many friends. He resigned from the court in December, 1914, to live in enjoyable retirement till his death, March 26, 1922. As was said of him by

Chief Justice Rugg: "His career has added substance and lustre to the judicial annals of Massachusetts." The Academy may be proud of its Fellow.

WILLIAM C. WAIT.

EDWARD WASHBURN HOPKINS (1857-1932).

Fellow in Class IV, Section 3, 1915.

Edward Washburn Hopkins was born in Northampton, Massachusetts, on September 8, 1857, and died in Madison, Connecticut, on July 16, 1932. He was for half a century recognized as one of the leading Indological scholars of the world.

He graduated from Columbia University in 1878, and immediately went abroad, to Germany, where he spent three years studying Sanskrit, Iranian, and comparative philology at Berlin and Leipzig. He took the doctorate at Leipzig, under Ernst Windisch, in 1881, with a dissertation on the relations of the four castes in Manu. Returning to this country he was appointed Tutor in Latin at Columbia, which position he held from 1881-5, giving instruction also in Sanskrit and Avistan. From 1885-95 he was Professor of Greek, Sanskrit, and Comparative Philology in Bryn Mawr College. In 1895 he was called to Yale University as Salisbury Professor of Sanskrit and Comparative Philology, in succession to William Dwight Whitney. This position he held until 1926, when he retired and was made Professor Emeritus.

He spent one year (1896-7) in study and travel in India. In 1911 he visited the International Congress of Orientalists at Athens, and was given an honorary degree by the University of Athens. He also received honorary degrees from Columbia and Yale.

His scholarly activities covered a very wide field, but were especially noteworthy in sociological and religious subjects. Besides his doctoral thesis, mention may be made of his important monograph on the 'Ruling Caste' in ancient India; his books on *The Religions of India* (1895), *The Great Epic of India* (1901), *India Old and New* (1901), *Epic Mythology* (1915), *The History of Religions* (1918), *Origin and Evolution of Religion* (1923), and *Legends of India* (verse translations; 1928). His articles in scholarly journals and in encyclopedias

(notably Hastings' *Encyclopedia of Religion and Ethics*) are far too numerous to permit mention even of illustrative examples; yet not a few of them contain enough matter to justify a book. His scholarship was thorough and painstaking, always based on sound and far-reaching acquaintance with original sources. In his two above-mentioned books on religions in general, he went far beyond the field of Indology and showed a mastery of the whole vast subject of the history of religion.

He was elected a Fellow of the Academy on May 12, 1915.

FRANKLIN EDGERTON.

HECTOR JAMES HUGHES (1871-1930).

Fellow in Class I, Section 4, 1915.

Hector James Hughes was born at Centralia, Pa., on October 23, 1871, the son of James H. and Mary (Miller) Hughes. He studied at the public schools in Williamsport, Pa., and at Harvard College, where he graduated A.B. in 1894, specializing in languages, history, and economics.

After graduation, he entered civil engineering work until 1897, when he returned to Harvard and pursued professional engineering studies in the Lawrence Scientific School, from which he received an S.B. degree in Civil Engineering, June 1899. He then entered the engineering office, in Chicago, of the Chicago, Burlington and Quincy Railroad.

He returned to the Harvard Engineering School in 1902 as instructor, and remained there as a teacher of engineering until his death on March 1, 1930. He was appointed successively assistant professor, professor of Civil Engineering, Director of the Harvard Engineering Camp at Squam Lake, N. H., and Dean of the Harvard Engineering School (in 1920).

In all his work, Dean Hughes showed marked executive ability and conscientious care. In the Summer Engineering Camp, he exacted strict discipline and required hard work from the students without loss of their respect and esteem. In the Engineering School, he insisted on the maintenance of high standards in work and scholarship.

Dean Hughes married Elinor Lambert of Cambridge, Mass., who, with their two daughters, Katherine Porter and Elinor Lambert, survive him.

A more detailed Minute of his professional work, publications, and accomplishments was published in the Gazette (June 14, 1930, page 220) of Harvard University, where he was held in high esteem and affection by his colleagues.

Dean Hughes was elected a Fellow of the American Academy in 1915.

ARTHUR E. KENNELLY.

WILLIAM DEWITT HYDE (1858-1917).

Fellow in Class III, Section 1, 1915.

William DeWitt Hyde was born on September 23, 1858 and died in 1917. He was elected a member of this Academy in 1915.

After preparing for college at Phillips Exeter Academy, he entered Harvard College in the autumn of 1875 and took his A.B. degree in 1879. Immediately on graduation he entered the Union Theological Seminary in New York, and after a year at that institution spent additional years in the Andover Theological Seminary. In 1883 he became minister of a Congregational church in New Jersey, where he performed his parish duties with energy and devotion, and with extraordinary success. Very shortly, in 1885 his career took an entirely new turn. He became president of Bowdoin College and also professor of Philosophy in the institution. It is no secret that the appointment was made largely on the recommendation of his friend Professor George Herbert Palmer. Hyde had been in close contact with Palmer during and after his college course, and a friendship arose, based upon a degree of mutual respect and regard not often seen between men of different generations. Hyde remained President of Bowdoin College until his death on June 29, 1917.

His leadership of Bowdoin College was beyond praise. Though a young man, at the outset a stranger to the college and to the alumni, and without experience as a teacher, he became at once the very heart of the institution. By nature and temperament he was a teacher and a spiritual leader. He had a remarkable gift of language,

spoken and written, a vigorous personality, and all the qualities of an inspiring teacher. He had executive ability as well, and both in dealing with faculty and students was prompt, just, sound in judgment, unhesitating in decision. From the start his views on the fundamental questions of academic policy were settled. He believed that the college of moderate size, distinct from a university, had a place of the first importance in American life and culture. Bowdoin College was to be maintained and developed as an institution which should do its full duty in accord with that tradition. As part of this settled policy he aimed first of all to secure men of the right kind as students and as teachers. In his selection of teachers and professors weight was laid not only on intellectual and scholarly competence, but upon soundness of character, and effectiveness of personality and of teaching gift. His judgment in the selection of teachers was proved by the fact that those whom he caught young, so to speak, and brought to Bowdoin, were frequently asked to accept positions elsewhere at larger institutions, with higher salaries and wider opportunities. He was entirely content that this should happen, believing it to be better to have a first-rate man for a few years than one of less quality for life. To the writer of the present memoir he once remarked that if he succeeded in appointing a first-rate young professor once a year, he believed he was achieving his chief task as president.

President Hyde had an extraordinary gift of statement, oral and written. He was a wide reader, and a lover of all good literature in verse and in imaginative writing as well as in philosophy and history. His preaching and his public addresses were distinguished by fluency, ease, and roundness of statement. The same facility appeared in his books. Of these there was a constant succession. Among them may be mentioned: *Practical Ethics*, 1892; *From Epicurus to Christ*, 1905; *Practical Idealism*, 1897; *The Quest of the Best*, 1913. They made no show of being products of research or the results of profound scholarship. While the writings of a man imbued with scholarship, they were addressed to the general public, and always were homiletic in character.

Hyde took an active part in social movements, and might have been enlisted in political life if he could have been brought to consent to

such a change; but he was rightly convinced he could be most useful as a teacher, educator, and preacher. A convinced believer in the Christian faith as it was held by his ancestors, he was none the less catholic as regards the beliefs of others, and strongly favored union among the denominations.

Strong, earnest, direct, equipped with the full culture of his profession, eager to help in every good work, conservative by nature and training yet tolerant and forward looking, he won universal admiration as a noble representative of the best of the New England which even in his own day was becoming old.

F. W. TAUSSIG.

CHARLES WILLISON JOHNSON (1863-1932).

Fellow in Class II, Section 3, 1917.

Mr. Johnson, naturalist of the old school, came to Boston in 1903 to take charge of the collections of the Boston Society of Natural History. His earlier activities, with biographical data and portrait, have been published elsewhere, from several sources.¹ They all record singleness of purpose, friendliness, joy in scientific work, and a contented life such as is rarely found. The following note, read at a memorial meeting, describes him as Curator of Insects and Molluscs:—The door of Mr. Johnson's room was always open, as he sat close by the window with a tray of insects at hand. There might be a fire, a traffic jam or riot in the thoroughfare outside. He saw it not, but deftly transferred, examined and recorded his insects, never breaking a leg or antenna in the tangled mass. Whenever any one—school-boy, expert, old friend or stranger—crossed the threshold, his work was laid aside. His time and wealth of information were at every one's disposal. Often I have visited there, and never without learning

¹ Brooks, W. S., *Bull. Bost. Soc. Nat. Hist.*, Oct. 1932, No. 65, p. 3-5.

Brues, C. T., *Entomological News*, 1933, vol. 44, p. 113-116.

Gray, A. F., *The Nautilus*, 1933, vol. 46, p. 129-134.

Melander, A. L., (*Entomological publications of C. W. Johnson*, 180 titles)

Psyche, 1932, vol. 39, p. 87-99.

Rehn, J. A. G., *Science*, 1932, vol. 76, p. 226-227.

much and developing a taste for more, as with the utmost simplicity Mr. Johnson drew upon his boundless lore of insects and of molluses.

Of course the collections in both branches, of which he had charge, were in perfect order. He knew most of the thousands of specimens by name, and produced immediately what was relevant to the matter in hand. Suppose you came with some beetle which had attracted your attention, common, it turns out, as English sparrows. "That," he would say, "is an interesting specimen, though not rare." Then he might mention that in your locality back in '69 some one had found a beetle never collected since. The Society's specimen of that other insect was a poor one—perhaps you might find a better—and with anecdotes of catches and collectors, invariably kindly told and entertaining,—with delightful stories of amazing habits and fascinating peculiarities of sundry insects, all suggested by your specimen,—with questions of nomenclature raised it seems by every myriad midge, to be disposed of incidentally,—the visitor left, to collect more wisely, and to plan another such pleasurable encounter. Should the specimen be a rare one, his beaming smile was glorious. "By Jove, that little fly is new to me," I heard him say but once; and the next day he could report that some one had taken three specimens in Michigan, with no other record to date. His detailed knowledge of the groups in which he was specially interested was impressive.

For him there was no idle time. When absent from the Museum, he was surely off collecting, and in his patient work he took unending satisfaction. It was Edward Everett Hale, speaking at a meeting of the Boston Society of Natural History, who said,—*"I like these meetings. I sometimes think that people who care nothing about plants and insects will have nothing to talk about when they go to heaven. For the good Lord is interested in these things, or He wouldn't have made so many of them."* So Mr. Johnson must have thought. In a sentence he tells the secret of his fine work as curator,—*"I dearly love to assist and encourage others in the study of nature."* He did exactly that, with a modesty and simplicity concealing the deep, wide knowledge that made his help effective.

FREDERIC T. LEWIS.

WILLIAM WILLIAMS KEEN (1837-1932).

Fellow in Class II, Section 4, 1901.

William Williams Keen was born in Philadelphia, January 19, 1837, the son of William Williams Keen and Susannah Budd. He was graduated from Brown University in 1859 and returned for a postgraduate year in chemistry, physics and English literature.

Upon matriculating at Jefferson Medical College in 1861, he was fortunate in coming under the influence of S. Weir Mitchell. After receiving his degree in 1862 he was appointed Acting Assistant Surgeon in the United States Army and was assigned to work under Mitchell. Between 1862 and 1864 their studies on injuries to peripheral nerves were made and he soon became known through his publications in association with Mitchell and Morehouse. The next two years were spent in study abroad.

Upon his return in 1866 he was elected to the staff of St. Mary's Hospital in Philadelphia where he served until 1889 and at the same time was a chief in the Medical Clinic at the Jefferson Medical College. He also took over the private Philadelphia School of Anatomy where he lectured on anatomy and operative surgery until 1875. He stopped his work in the Medical Clinic at Jefferson in 1869 but continued his lectures on pathology until 1875. His lectures at the Philadelphia School of Anatomy brought him considerable renown as a teacher and he was appointed Professor of Artistic Anatomy at the Pennsylvania Academy of Fine Arts in 1876, a position which he held until 1890.

When the International Medical Congress was called in Philadelphia in 1876 he was one of the secretaries. Lister was made the chairman of the section on surgery. In his address he outlined his antiseptic system. Doctor Keen later wrote:—"As a result of this debate I was completely convinced of the value of Lister's methods. From the first day of October, 1876, I never swerved in my allegiance to antiseptic surgery and its later development, aseptic surgery." He was the first surgeon in Philadelphia to introduce the newer surgery.

The following year, Doctor Keen became a Consulting Surgeon and Lecturer on Clinical Anatomy at the Woman's Medical College and was appointed Professor of Surgery at this institution in 1884.

He resigned the position upon his election to the chair of Surgery at Jefferson in 1889. He held the chair until his retirement in 1907.

Although his interest in neurology and the surgery of nerves started from earlier researches with Weir Mitchell, his attention was focused on surgery of the brain by a series of circumstances which he always regarded as the "hand of Providence." He was given the task of revising Gray's Anatomy in 1886. Since the previous edition a number of new facts on cerebral localization and the pathways of impulses in the central nervous system had been discovered. Doctor Keen found it necessary to make a thorough study of these recent developments in order to revise the text book. His edition was printed in 1887. Shortly after publication a patient presented himself with symptoms which led Doctor Keen through his recent knowledge of cortical localization to diagnose a brain tumor. Removal of this tumor, the largest successfully removed up to that time, added to his reputation and he became known as America's first and most prominent brain surgeon.

His professional interest was not limited to neurosurgery, but embraced the entire field of medicine. His original contributions, numbering more than 250, spread over 62 years. Although he never performed animal experiments he was eager to further the development of experimental research and strenuously opposed all efforts of the anti-vivisectionists. Many of his writings in later years were directed against them and he willingly became the target of their invective.

His lectures and clinical instruction were given with painstaking thoroughness from hand-written notes. He never read his lectures and was most meticulous in his use of English. Towards the close of his life he frequently spoke over the radio on questions of public health. On one occasion his voice was recognized by a physician in Saskatchewan who had been his pupil 40 years before.

Thoroughness pervaded his whole being, combined with wide and eager interest in his surroundings. He was an omnivorous reader and took careful notes. His chief relaxation came from this source and from personal contacts. Up to the last year of his life he was actively engaged in correspondence with hosts of friends throughout the world on scientific, political and religious matters.

As an operator he was bold but very painstaking and careful. The welfare of his patient was always his first concern. In the words of Lord Moynihan: "His work upon all branches of surgery—and he practiced all with immense success—was perhaps the most considerable and the most inspiring of that of any surgeon in the States."

In addition to his original contributions in the field of surgery he was the author of a number of books both of medical and of general interest. The following are some of his better known works: *Early History of Practical Anatomy*, 1870; *Surgical Complications and Sequelae of Typhoid Fever*, 1898; *History of the First Baptist Church, Philadelphia*, 1898; *Animal Experimentation and Medical Progress*, 1914; *The Surgical Operations on President Cleveland in 1893*, 1917; *Medical Research and Human Welfare*, 1917; *Everlasting Life*, 1924.

He also edited in 1870 *Practical Anatomy—Manual of Dissections*; 1879, *American Health Primers*; 1887, *Gray's Anatomy*; 1892, *An American Text Book of Surgery*; and in 1905 to 1921, *Keen's Surgery*.

Honors were showered upon him: he was President of the American Philosophical Society, the American Surgical Association, the American Medical Association, the College of Physicians of Philadelphia, the Congress of American Physicians and Surgeons, and the Fifth International Surgical Congress.

He was an honorary member of most of the European medical and surgical societies as well as an Honorary Fellow of the Royal College of Surgeons of England, Edinburgh and Ireland. He received honorary degrees from many universities both at home and abroad and was decorated by France and Belgium. Many medals were bestowed upon him, including the Henry Jacob Bigelow Gold Medal of the Boston Surgical Society for contributions to the advancement of surgery. Doctor Keen was also very proud of his Loyal Legion Medal for service as a Lieutenant during the Civil War and his Victory Medal for service as a Major in the Medical Reserve Corps of the United States Army during the World War.

His interest in Brown University never flagged. He was a Trustee from 1873 until 1895 and then a Fellow until his death. Deeply religious, he took an active part in the Baptist Church as a Trustee of Crozer Theological Seminary for 65 years and as Deacon and Trustee of the First Baptist Church of Philadelphia.

The last months of his life were spent as an invalid but he still maintained his active interest in his surroundings and in the developments of science and medicine. Always cheerful, he greeted friends with his customary smile and ready wit. At the time of his death, June 7th, 1932, he was in his 96th year. In his will, besides personal bequests, he endowed a Fellowship at Brown University for research in one of the fields of pure science.

NORMAN E. FREEMAN.

OLIVER DIMON KELLOGG (1878-1932).

Fellow in Class I, Section 1, 1921.

Oliver Dimon Kellogg was born on the tenth day of July, 1878, at Linnwood, Pennsylvania. His father was the Rev. Day Otis Kellogg and his mother, Sarah Cornelia Hall. The family was far from affluent so that Kellogg learned stern lessons in economy. In college he was largely on his own resources and had to meet his expenses by his own efforts. This training gave him an appreciation of the difficulties of the poor student which was invaluable to him in later life when he was father confessor to many a young man of high ambitions but slender purse.

Kellogg's first venture away from home was at the preparatory school in Lawrenceville, N. J. Later he entered Princeton and began specializing in mathematics. He was especially happy in his association with Edgar Odell Lovett, now President of the Rice Institute, and the much-beloved Henry Burchard Fine. He graduated in 1899, a member of Phi Beta Kappa, and received the degree of A.M. a year later. There followed three years in Germany, divided between Göttingen and Berlin. He took his doctorate in the former place in January 1903, writing his thesis under David Hilbert on the application of linear integral equations to Potential Theory. As the twig was bent, so grew the branch. His interest in Potential Theory lasted throughout life.

He returned to Princeton for two years in the autumn after his German promotion, but there was no permanent vacancy in his own university, so he transferred to the University of Missouri where he occupied the positions of assistant professor and professor until 1918.

During these busy years when he obtained valuable experience in problems of university administration and helping undergraduates with their personal difficulties, he married Edith Taylor on August 26, 1911, and she, with her daughter, Margaret Philbrick, survives him. In 1918 he departed on leave of absence for New London, Connecticut, to study problems of submarine detection with a group of physicists who were occupied with this pressing question. This work was done under the pressure of great haste, but Kellogg's directness, promptness, and accuracy were of fundamental advantage to all the scientists employed. His leave of absence in 1918 was extended another year to enable him to come to Harvard as lecturer. It was never renewed, for his connection with the University of Missouri terminated at the end of that year and he made his final move to Harvard. He began as an associate professor and was appointed to a full professorship in 1927.

Kellogg's doctor's thesis at Göttingen dealt with an application of linear integral equations to Potential Theory. The subject of Potential Theory, which is of fundamental importance both in mathematics and physics, was to occupy much of his future attention. If a region of space be permeated by a system of gravitational or similar forces, the mathematical handling of the situation is simplified by the fact that there exists a function depending upon position alone from which it is possible to deduce the distribution of forces. Such a function is called a potential function. To Kellogg are due a number of results of importance in this domain, in particular some concerning the dependence of the potential function upon the boundary values; it is significant of the originality of his ideas that an illuminating example constructed by him was the direct occasion of a fundamental theoretic advance. His book, "The Foundations of Potential Theory," published in Berlin in 1929, is regarded as the principal text in the field. At the time of his death he was eagerly making preparations for an advanced companion volume dealing with the same topic.

His mathematical interests were, however, by no means limited to Potential Theory. Not only did he have an unusual grasp of many branches of mathematical physics, but he wrote original papers in such varied fields as linear differential equations, series of orthogonal functions, function-space, the theory of the gyroscope, and the theory

of numbers. His work was characterized by persistence and ingenuity, and he seldom abandoned a problem which had once occupied his attention, until he had definitely contributed to its solution.

The outstanding traits in Kellogg's character were sympathy and sensitiveness. He was equally at home in dealing with a charming but inconsequential freshman who had yet to learn that life was a serious matter, with the overworked and over-worried graduate student who had more financial anxieties than professional prospects, or with the distinguished colleague in Europe or America who was puzzled by a question of priority or a matter of professional etiquette. His sympathy was poured out impartially on old and young. Old and young loved and trusted him in return. He died of heart failure Friday, August 26, 1932, while climbing alone on the hills of Maine. He died as he lived, looking forward and climbing upward.

JULIAN L. COOLIDGE.

EDWARD SKINNER KING (1861-1931).

Fellow in Class I, Section 1, 1915.

Born at Liverpool, N. Y., May 31, 1861, son of Nathaniel and Cornelia C. King; died at Cambridge, Mass., September 10, 1931.

Degrees: A.B., 1887, A.M., 1890, Sc.D., (Hon.), 1927, Hamilton College.

As an undergraduate Professor King concentrated in mathematics, studying under Professor C. H. F. Peters, to whom is to be attributed his entrance into astronomy. Professor Peters sent him in 1887 to Professor Pickering who, in 1889, placed him in charge of the Harvard Station near the summit of Mt. Wilson. In 1890 he returned to Cambridge, and on July 23 of that year married Kate Irene Colson of Batchellerville, N. Y. Mrs. King and two children, Harold Skinner and Margaret Wight, now survive. The third, Everett Tryon, died in 1918.

From 1893 until his death he superintended the photographic work of the Harvard Observatory.

His major scientific work was concerned with standard photographic photometry of stars and planets and with tests of photographic plates.

University appointments:

1887-1913 Observer

1913-1926 Assistant Professor of Astronomy

1926-1931 Phillips Professor

Tenure of this latter office ended on September 1, 1931, with his retirement.

Memberships: Fellow Am. Acad. Arts and Sciences; A.A.A.S.; Am. Astron. Soc.; Int. Astron. Union; Société Astronomique de France; hon. mem. Nantucket Maria Mitchell Assn.; Phi Beta Kappa.

A fine tribute to Professor King is contained in a letter to him from Professor S. I. Bailey sent shortly before the latter's death. "To have done work which is widely recognized, to have gained the sincere esteem of many and the real love of even a few, surely these are sufficient reasons to look on life as well worth the living."

L. B. ANDREWS.

ROBERT WILLIAMSON LOVETT (1859-1924).

Fellow in Class II, Section 4, 1922.

Dr. Robert Williamson Lovett was elected a Fellow of the American Academy of Arts and Sciences on May 10th, 1922. At this time he occupied the John Ball and Buckminster Brown chair of Orthopaedic Surgery at the Harvard Medical School. He was also in charge of the Orthopaedic Department of the Boston Children's Hospital, surgeon-in-chief of the New England Peabody Home, consulting surgeon to the New York State Board of Health, chairman of the Harvard Infantile Paralysis Commission, corresponding member of the British, French and Italian Orthopaedic Associations, member of the Société Internationale de Chirurgie, Fellow of the American College of Surgeons, member of the American Orthopaedic Association (Pres. 1897), American Medical Association, Massachusetts Medical Society, Boston Surgical Society (Pres. 1920-'22), and of many social organizations.

Dr. Lovett was born in Beverly, Massachusetts, on November 18th, 1859, the son of John Dyson and Mary (Williamson) Lovett. He was graduated from Harvard College in 1881, from the Harvard Medical School in 1885, and received his surgical training at the

Boston City Hospital, becoming later a member of its surgical staff. He practised general surgery in Boston until 1899, when he began to limit his private work to orthopaedic surgery and his hospital work to the Boston Children's Hospital. During the World War, Major Lovett was placed in charge of the training of surgeons to fit them to care for bone and joint casualties. Under his direction, army teaching centers were organized throughout the country and an important national service was performed.

His contributions to medical literature were many. Books on Lateral Curvature of the Spine, Hip Disease, Infantile Paralysis, text-books on Orthopaedic Surgery in collaboration at first with Dr. Edward Hickling Bradford and subsequently with Sir Robert Jones, Bart., of England, ran through many editions.

Robert Lovett may be said to have been an aristocrat of medicine, keeping his own counsel, maintaining and demanding high standards of research and clinical practice; not above compromise but at the last ditch, fighting if necessary with adroitness and courage. Friends held him fast. He possessed an unusual charm of companionship in diversion. The personal tribute of Sir Robert Jones in the British Medical Journal well epitomizes his character: "He represented the highest ideals of our art and brought to bear upon it the rich power of a cultured mind."

The fragile health of his later years broke under the strain of public and private work. He was taken ill on a voyage to England in the summer of 1924, and died in Liverpool at the house of Sir Robert Jones on July 6th, 1924.

ROBERT B. OSGOOD.

NATHAN MATTHEWS (1854-1927).

Fellow in Class III, Section 1, 1914.

Nathan Matthews was born March 28, 1854, and died in 1927. He took his bachelor's degree at Harvard in 1875, his degree as bachelor of law in 1880 and he was made doctor of laws in 1909. All his life he was a lawyer in busy practice, but he could always spare the time for public service. He became Mayor of Boston in 1891 and served as such for four terms until the end of the year 1895.

His mayoralty was a very notable one and is still regarded as a model for city administration. He served later on several commissions for the government of the city, but particularly as chairman of a Commission for the Proposal of a New Charter for the City of Boston. The commission studied the situation with great fullness and recommended the charter under which the city of Boston is governed today. Nathan Matthews was a man of true scholarly nature and applied to current problems of practice and of politics the attitude which another might have applied to the investigation of abstract truth. He studied with the greatest care every problem brought before him, whether as counsel or as mayor, and proved in his own life the power of scholarship to solve concrete problems. He was elected a Fellow in May 1914.

J. H. BEALE.

CLIFFORD HERSCHEL MOORE (1866-1931).

Fellow in Class III, Section 2, 1910.

Clifford Herschel Moore was born on March 11, 1866, in Sudbury, Massachusetts. Of old New England stock, he was the seventh of his line in as many generations to be born on the same farm. His grandfather was for forty consecutive years moderator of the Town Meeting. He himself was proud of the New England tradition which he well exemplified even when his influence extended far beyond New England.

After preparation at the Framingham High School, Moore entered Harvard College, and graduated in 1889, *summa cum laude*. Though his chief field of scholarly interest, then as always, was in the classics, he read widely in other subjects, developed his interests in music and literature, and made many friends. Three years of experience in teaching at the Belmont School, in California, and two years at Phillips Academy, Andover, contributed not a little to his later success as a college teacher. In spite of the brevity of his stay at Andover he left such a mark that eight years later he was made a Trustee of the Academy, and held his trusteeship for the rest of his life.

From 1894 to 1898 Moore served at the University of Chicago as Instructor and as Assistant Professor of Latin, except for the year

1896-97, which he spent at the University of München, winning the degree of Ph.D. *summa cum laude*. In 1898 he returned to Harvard as Assistant Professor of Latin; in 1905 he became Professor, and in 1925 was named Pope Professor of Latin. Among the temporary appointments that he held were those of Annual Professor in the American School of Classical Studies in Rome (1905-06), Harvard exchange professor at certain western colleges (1913), lecturer of the Lowell Institute (1914), and Ingersoll Lecturer on the Immortality of Man, at Harvard (1918). He received from Colorado College the honorary degree of Litt.D. (1914). Among learned societies of which he was a member mention may be made of the New England Classical Association, of which he was president in 1910-11, the American Philological Association, of which he was president in 1919-20, the American Philosophical Society, the American Historical Association, and the Dante Society. He was elected a Fellow of the American Academy of Arts and Sciences on March 9, 1910 (Class III, Section 2), and enjoyed attending its meetings whenever he was able.

Although Moore was a capable scholar in many fields of classical scholarship, and gave instruction and published works in the fields of literature, history, grammar, epigraphy, and antiquities, his chief interest was in Greek and Roman religion and philosophy and their influence on Christian thought. Probably his most widely read works are his edition of the *Odes* of Horace and his Lowell Institute lectures on "The Religious Thought of the Greeks." His last published work, which appeared within a few months of his death, was on "Theories Regarding the Immortality of the Soul." As a teacher he was incisive and stimulating; he was impatient of slipshod work, and knew how to call forth his students' best efforts.

Moore's executive ability, early recognized, caused him to devote an increasing proportion of his time to the administrative duties that were laid upon him. For some years he was Chairman of his Department; the critical year 1918 found him discharging the duties of acting Dean of the Graduate School of Arts and Sciences, Chairman of the Committee on Instruction, and Director, under the Federal Government, of the S. A. T. C. first of Harvard and then of all the New England colleges. In 1925 he became Dean of the Faculty of

Arts and Sciences, and was thus responsible for the budget and for many other tasks which had hitherto been borne by the President. In most of the educational policies that matured during the last twenty-five years of his life he had a large share,—entrance requirements, the modification of the elective system, the institution of the general examination and the tutorial system, the increase both of tuition fees and of salaries, the organization of the Houses. More and more his energy and tact, his judgment and practical idealism, his friendliness and courtesy in dealing with people, won respect and affection and achieved abundant results. Though he knew his own mind, he could work with others, and could sink personal preferences in a common undertaking. He knew how to lead discussion, or, on occasion, how to cut it short. It can not be said that he suffered fools gladly; nevertheless, he gave of his time and strength generously to many who had little claim on him. In him the man was never lost in the official; and younger men, whom he went out of his way to encourage, were put at their ease when in company with him. If he invited their opinions, it was because he genuinely valued them.

Moore was married in 1890 to Miss Lorena Leadbetter, of Charlestown, Massachusetts. Their home on Brattle Street, Cambridge, gave hospitality to young and old, and to many outside the immediate academic circle. Here were to be found a gracious welcome, broad human sympathies, and much good talk. Moore's fondness for the out-of-doors found expression both in his summer vacations in the Adirondacks and in winter outings. He was an accomplished figure-skater. The illnesses of his later years were borne with a cheerful fortitude.

On August 31, 1931, Moore died in Cambridge. In him there was something of the Greek, something of the Roman, and much that was drawn from his native New England.

WILLIAM C. GREENE.

GEORGE FOOT MOORE (1851-1931).

Fellow in Class III, Section 2, 1906.

George Foot Moore, Fellow of the Academy, Class III, Section 2 from 1906 onwards and President from May 1921 till May 1924, was

born at West Chester, Pennsylvania, on October 15, 1851. He received his education at West Chester Academy, at Yale and at Union Theological Seminary. After some years of teaching and ministerial work he was in 1883 called to the chair of Hebrew at Andover Theological Seminary, where he taught till 1901, being President from 1899 to 1901. In 1902 he passed to Harvard as Professor of the History of Religion, a position which he occupied till his retirement in 1928. In 1909-10 he was Harvard Exchange Professor at the University of Berlin. He was President of the Massachusetts Historical Society, Vice-President of the Colonial Society of Massachusetts, and Doctor honoris causa of Harvard, Yale, Göttingen, and several Jewish institutions. He died in Cambridge on May 16, 1931.

He started life as a scholar with an admirable linguistic foundation and grew up in a time of very rapid advance in the study of various fields of the history of religious thought and practice. His marvellous powers of work and his rare zest for knowledge enabled him to keep abreast of these advances in a manner which was unique and can hardly be seen again. This width of range went hand in hand with intensive work of a very high order. In all that he did, in his writing, in his teaching, in his remaking of the Harvard Theological Review, there was an unhurried thoroughness. He was by nature a severe critic, to none so severe as to himself, impatient of all humbug and all half knowledge, but always ready to extend the greatest generosity to any honest student, reserved but with a remarkable gift of friendship and a delicate humor.

His editions of Judges (1895, 1898, 1900) and his articles in the *Encyclopaedia Biblica* established his reputation as a Semitist of eminent distinction. His *History of Religions* (1913/9) is the only notable survey of the whole field made by one man, and in its brevity represents the final crystallization of very long thought and study; it is one of the few general treatises of which specialists praise the sections referring to their own topics. A shorter book, *The Birth and Growth of Religion* (1923) remains the best introduction to the subject as a whole. These works would in themselves have justified his great reputation, but his last book, *Judaism* (1927/30), is in a higher class. It belongs to that rarest type of work in which something of the past comes to life in its own flesh. The reader knows intuitively

that it is not another book about Judaism, but something which a Rabbi of the second century of our era might have recognized as a worthy *Summa Theologica* of his own belief. He had given to the dead his blood, and they had drunk, and could speak.

ARTHUR DARBY NOCK.

THOMAS BURR OSBORNE (1859-1929).

Fellow in Class I, Section 3, 1914.

Thomas Burr Osborne was born in New Haven, August 5, 1859, his early ancestors on both sides having been of good English stock who came to New England in the early colonial years. His paternal ancestor, Richard Osborne, settled at Hingham, Massachusetts in 1635, removing to New Haven four years later, while his mother, Frances Louisa Blake, was a descendant of William Blake who settled at Dorchester, Massachusetts in 1630.

From his mother's side Osborne undoubtedly derived many of the traits of character that helped in the development of his life-work. His great-great uncle, Eli Whitney, was the inventor of the cotton gin, while his grandfather, Eli Whitney Blake, was the inventor of the stone crusher. Further, through his maternal grandmother, he was sixth in descent from the Reverend James Pierpont who graduated from Harvard in 1681 and who shortly thereafter became the pastor of the first church at New Haven. On the side of his father, Arthur Dimon Osborne, there was a long line of Yale graduates beginning with his great-great-grandfather, Ebenezer Dimon of the Class of 1728, down to the subject of this sketch, who gained his Bachelor's degree in 1881.

During the following five years, Osborne's time was spent mainly in the study of chemistry at Yale, doing some teaching and some research, but in 1886 he joined the scientific staff of the Connecticut Agricultural Experiment Station and was soon embarked on his life work, the investigation of the fundamental chemistry of proteins, especially the proteins of vegetable origin. For twelve years Osborne studied in great detail the proteins of thirty or more grains and seeds, beginning with the oat kernel, inventing new methods of procedure in an effort to obtain the proteins in the purest possible forms. At

that date it was the generally accepted belief that there were only a few chief types of vegetable proteins, and that chemical composition was the sole criterion of purity and individuality. Further, physiologists held the view that the different vegetable albuminoids were practically alike in their nutritive or biological value.

As Osborne's work proceeded it became clear that the number of different proteins in nature was not so limited as had been believed, for seed after seed yielded apparently pure substances that plainly were not identical, such, for example, as edestin from hemp seed, wheat, rye, etc., avenalin from the oat kernel, conglutin from lupine seed, excelsin from Brazil nut, amandin from the almond and corylin from the walnut, six distinct proteins which previously had been looked on as identical and grouped together under the name of vitellin. Some of these globulins Osborne obtained in well defined crystalline forms, thus emphasizing that they were without doubt definite chemical individuals.

Next followed an investigation, extending through several years, of the partition of nitrogen in these vegetable proteins, using the Hausmann method with some modifications. By this method Osborne and his associates hydrolyzed some thirty odd individual proteins, representing various types from different sources, comparing the yield of the various α -amino acids, basic amino acids, etc., by which striking differences in the chemical make up of the vegetable proteins were revealed. As a simple illustration, Osborne found that leucosin, a protein of the wheat kernel, yielded 6.73 per cent of glutamic acid, while gliadin of wheat yielded 37.33 per cent of this acid. Again, leucosin gave on hydrolysis 2.75 per cent of lysine, while gliadin yielded none of this base. This demonstration that many of the vegetable proteins differ widely in their amino acid composition introduced a new factor in the identification of individuality, but even more important was the suggestion, which Osborne quickly recognized, that the character and amounts of the various substances represented by the basic and non-basic nitrogen of the protein molecule may have an important bearing on the physiological and nutritive value of the individual proteins.

This led to Osborne's work on nutrition and growth, in which he was associated with Lafayette B. Mendel; work which continued

from 1909 to 1928 and which was concerned primarily with the biological value of individual proteins, as revealed by feeding small animals, under carefully defined conditions, with pure proteins of known constitution. By such methods of study it was soon found that with certain proteins growth could not be maintained, while with others of different chemical constitution growth was vigorous. Thus in time Osborne was able to differentiate between adequate and inadequate proteins, lack of growth being due to the absence of certain amino acids in the protein fed. Thus, for example, edestin and wheat glutenin were found to be adequate proteins, animals growing well on such a diet, while on zein from maize there was failure of growth, due to the fact that this protein is lacking in the amino acids lysine and tryptophane. In this manner there was opened up a new chapter of the greatest physiological importance bearing on the synthetical production of protein by the animal body from the crystalline fragments which result from the breaking down of food proteins in the processes of digestion, etc. Again, in their work on nutrition Osborne and Mendel brought to light much that contributed to our knowledge of those factors of growth which are now associated with the vitamins, as well as the effects of the individual inorganic constituents of the diet.

While the problem of protein differentiation was helped greatly by use of the methods of amino acid analysis, Osborne in collaboration with H. Gideon Wells, by several years of close study of the anaphylaxis reaction of vegetable proteins, was able to make differentiation between proteins that had hitherto shown no chemical differences. Osborne believed that the specificity of the anaphylaxis reaction depended on the chemical structure of the protein molecule, "but structures sufficiently alike to give rise to this reaction are only observed in proteins derived from plants that are botanically closely related."

Osborne's work on the vegetable proteins, extending from 1889 until his retirement from active service in 1928, constitutes a remarkable example of persistent effort in the scientific study of a single group of substances and their derivatives; work that required great faith, painstaking accuracy, clear thinking and great originality. The results of his investigations have had a profound influence upon

many problems of biochemistry. Dr. Osborne died at New Haven on January 29, 1929. An adequate biographical memoir with a complete bibliography may be found in Volume XIV of the National Academy Biographical Memoirs, by Hubert Bradford Vickery; also in Bulletin 312, Connecticut Agricultural Experiment Station, February 1930, under the title "Thomas B. Osborne, A Memorial."

RUSSELL H. CHITTENDEN.

WILHELM OSTWALD (1853-1932).

Foreign Honorary Member in Class I, Section 3, 1905.

Professor Ostwald was a great teacher and a great organizer of scientific knowledge. He was the great leader in the development of physical chemistry. Many in the older generation of chemists in America today were his pupils.

He was born in Riga in 1853; he entered the University of Dorpat in 1872; his first scientific paper was published in 1875 and his doctor's thesis in 1878. In 1881 Ostwald was called to the Polytechnic at Riga as Professor of Chemistry, and here he began the preparation of his *Lehrbuch der Allgemeinen Chemie*. In 1887 he took the chair of Physical Chemistry at Leipsic and it was in the same year, just before he went to Leipsic that he began the publication of the *Zeitschrift für Physikalische Chemie*. Ostwald's important work was done at Leipsic between 1887 and 1906. His laboratory grew in fame and became so crowded that it was necessary to provide larger quarters. The Physical Chemistry Institute was built for him and dedicated in 1897. Besides directing this Institute he continued to edit the *Zeitschrift für Physikalische Chemie*. Ostwald's books, which are almost too many to enumerate, were nearly all of great importance and were powerful factors in spreading the doctrines of physical chemistry not only in Germany, but through translations into other countries.

In 1900 Ostwald invented, with the aid of his assistant Brauer, the process that bears his name, for the catalytic oxidation of ammonia by air in the production of nitric acid. Although this has since developed into a commercial process, Ostwald had no thought of immediate commercial profit; his motive was to ensure the military security of his country.

By 1906 Ostwald had begun to feel the strain of his many activities and he resigned his professorship. But this did not mean for him a rest. It was simply a transfer of his activities to other fields. He continued his interest in philosophy, which had been active since he had started in 1901 a new journal, the "Annalen der Naturphilosophie." A few of the books which he published from his home in Gross Bothen in Saxony give an idea of the activities of his later years. In 1909 a book entitled "Grosse Männer" in which he attempts to classify men of genius; in 1912 a book called "Der energetische Imperativ," and another entitled "Monumentales und dekoratives Pastell"; in 1923 "Farbkunde." He devoted much of his time in the later years to painting and to a study of the theory of color. In 1909 Ostwald received the Nobel prize for Chemistry.

Ostwald died April 4, 1932.

Ostwald's great service to science was made during his years at Leipsic, during which time he organized and consolidated that part of the field of chemistry which was opened by the brilliant theoretical work of Van't Hoff, Arrhenius, and Willard Gibbs. With his students he widened the experimental exploration of this field; with the *Zeitschrift* he recorded and in a way led the world's progress, and in his lectures and his books he organized this field into a well rounded branch of science.

One of the most interesting and appreciative accounts of Ostwald's life is by Wilder D. Bancroft in the *Journal of Chemical Education*, September and October 1933, pages 539 to 542 and 609 to 613.

ARTHUR A. BLANCHARD.

WILLIAM BARCLAY PARSONS (1859-1932).

Fellow in Class I, Section 4, 1914.

William Barclay Parsons was the son of William Barclay and Eliza Glass (Livingston) Parsons. He was educated in part in England and in part while travelling on the continent. He entered Columbia College in 1875, graduating in arts in 1879. Later he graduated from the School of Mines, as Civil Engineer, in 1882.

Beginning practice with the Erie Railroad, he reached the rank of Division Engineer, and wrote two books,—“Turn-outs” and “Tracks.”

From 1885 to 1891 he was in private practice with his brother, H. de Berkeley Parsons, in New York.

After serving on two commissions which planned subways for Manhattan, he became, during the Spanish American War, Chief of Engineers of the New York National Guard, with the rank of Brigadier-General.

In 1898-9, he planned nearly one thousand miles of railroad in China. When this was built, he became its Chief Engineer. This work is described in his book, "An American Engineer in China."

Returning to New York in 1899, he began work on New York's first subways, his outstanding work, and continued as Chief Engineer of the Rapid Transit Commission until 1904.

This year he became a member of the Isthmian Canal Commission, a majority of which, including the foreign members and General Parsons, reported in favor of a sea-level canal.

Resuming practice in New York, in 1905, under the name of William B. Parsons, Consulting Engineers, he was active in public works of many kinds, the firm continuing under various names until his death.

In 1904, he served as a member of the Advisory Board of Engineers for the Royal Commission on London Traffic. His paper before the Institution of Civil Engineers of Great Britain, in 1908, describing the New York subways, brought him the Telford Gold Medal.

General Parsons' list of notable engineering accomplishments is long, and includes such water works as those for Vicksburg and Natchez, Mississippi; such hydro-electric works as those at Spier Falls on the Hudson River, at McCall Ferry (Pennsylvania) and at Colliers (New York) on the Susquehanna River, at Ephratah (New York), at Altmar (New York) for the Niagara, Lockport and Ontario Power Company, at Diamond Creek (Arizona) on the Colorado River, various Hudson River projects, and the general Niagara development; such transit problems as those which confronted San Francisco, Detroit, Cambridge, Baltimore, Chicago, Philadelphia, Toronto, and other cities; the Havana Docks; and the Cape Cod Canal. His paper describing the latter was awarded the Norman Medal by the American Society of Civil Engineers in 1918.

He was the author of the article on "Rapid Transit" in the Eleventh Edition of the *Encyclopædia Britannica*.

In 1915, General Parsons was appointed Chairman of the Joint Commission of Engineering Societies to urge the organization of an engineering reserve in the Army. He achieved success when the Officers Reserve Corps was created. Later he was commissioned a major and helped to organize the regiment known during the World War as the 11th Engineers.

Later on, as a member of the Military Railways Commission, he included the first military units sent overseas. He performed signal service, returning to the 11th Engineers, then in England, as its Lieutenant-Colonel, and later fighting in France, notably near Cambrai and Peronne, and later in the Meuse, St. Mihiel and Argonne offensives. He ended the war as its commanding officer when the regiment disbanded in May, 1919.

Following the war, he was transferred to the Engineers Reserve Corps, and in 1922 was appointed Deputy Chief Engineer with the rank of Brigadier-General. For his services as Chief of the Military Railways Commission, and for his valor, General Parsons received the Victory Medal with five clasps, the Distinguished Service Medal and a citation for conspicuous service from the United States, the Distinguished Service Order from Great Britain, the Order of the Crown from Belgium, and the Legion of Honor from France.

Since the war, he has written "American Engineers in France," "Robert Fulton and the Submarine," and at the time of his death had almost completed his last work, "Engineers and Engineering of the Renaissance."

He was a member of the Institution of Civil Engineers of Great Britain, honorary member of the Institution of Architects, and a member of the Société des Ingenieurs Civils de France, as well as being a past director and honorary member of the American Society of Civil Engineers, and a member of many scientific bodies.

As Trustee of the Carnegie Institution, he took a special interest in the explorations made in Yukatan. As a Vestryman and Warden of Trinity Church, New York City, as Trustee of Columbia University, and as a member of various clubs and societies, his interests were large. He died in the Presbyterian Hospital, the last rivet in whose structure he drove on May 24, 1926. He was Chairman of the Joint Administrative Board of the Medical Center which built this hospital.

The degree of Doctor of Science was conferred upon him by Princeton University in 1920 and by Trinity College in 1921. He was made a Doctor of Laws by St. Johns College (Annapolis, Md.) in 1909, and a Doctor of Engineering by Stevens Institute in 1920.

General Parsons was finely trained, practical, broad-minded, and cosmopolitan in view. He had the imagination to conceive, the ability to express, and the enthusiasm and courage to carry projects to completion, as well as that fine mental balance which made him so useful in "controlling the forces of nature to the use of man." Gifted and honored, he always was modest and seeking to serve others.

General Parsons is survived by his wife, Anna DeWitt Reed of New York City, also by his son, Dr. William Barclay Parsons of New York City, and his daughter, Mrs. Rudolph Weld of Boston.

R. S. WESTON.

LOUIS VALENTINE PIRSSON (1860-1919).

Fellow in Class II, Section 1, 1917.

Louis Valentine Pirsson, professor of Physical Geology in the Sheffield Scientific School of Yale University and member of this Academy since 1917, died on December 8, 1919. He was born on November 3, 1860, in Fordham, New York. His early education was received under the tutelage of Rev. William J. Blain, of Amsterdam, New York, in whose family he lived for a number of years and until he was sixteen. He then attended school at Amenia Academy in Dutchess County, New York, subsequently moved to New Marlboro, Massachusetts. His interests even as a youth were strongly toward the natural sciences. It was therefore quite natural that he should enter the Sheffield Scientific School in 1879 for the continuation of his education. He graduated from this school with honors in the class of 1882. While an undergraduate his major field of study was chemistry and in the six years following his graduation he continued his chemical studies, supporting himself by tutoring and by acting as laboratory assistant for Professors Allen, Mixter, and later H. L. Wells.

During the year 1888-89 he served as professor of chemistry at the Brooklyn Polytechnic Institute. In the summer of 1889 he

secured through the influence of Professor Brush of Yale a position as field assistant to Dr. Arnold Hague on a survey party of the United States Geological Survey, and the season was spent in making a survey of the Yellowstone National Park. The experience crystallized his interest in geology and he determined to follow this field of work. In order to better prepare himself for this career, he returned to New Haven and studied under Professor S. L. Penfield and others. A second summer was spent in geological work in Montana under the direction of J. P. Iddings and W. H. Weed. After some further work in New Haven, he spent the next year and a half abroad, partly in travel and partly in study at Heidelberg under H. Rosenbusch and in Paris under Professors Fouqué, Millard and Lacroix. It was during this period that he was thrown into contact with a number of men who later, with himself, became leaders in petrographic work.

In the fall of 1892 he accepted a position to teach mineralogy and lithology in the Sheffield Scientific School under Professor Penfield. The following year he extended his teaching activities to include instruction in general geology. At this time he considered a proposal to accept a position left open by the death of Professor George H. Williams of Johns Hopkins University, but finally decided to remain in New Haven, and was appointed an assistant professor of inorganic geology in the Scientific School. In 1897 he was promoted to the grade of full professor with membership in the Governing Board of the Sheffield Scientific School, a position which he held until his death.

In the teaching of the course in general geology he was during the earlier years associated with Professor Beecher and after the latter's death with Professor Schuchert. His chief interest, however, lay in advanced instruction and research in the general field of petrology, and a number of geologists received their training in petrology under him during the next two decades.

One important outcome of his teaching work in introductory geology was a textbook. This was first planned in cooperation with Professor Beecher and after his death was carried on with Professor Schuchert. This text was issued in two parts; the first dealing with inorganic geology was written by Pirsson, the second, covering historical geology by Schuchert. This excellent text has been widely

used for many years in American colleges. Shortly after the publication of this text Professor Pirsson issued another book entitled "Rocks and Rock Minerals." While this book dealt primarily with rocks from the megascopic point of view, it contained an excellent general treatment of the principles of geology. He had in mind a more advanced text in petrology and had prepared a considerable portion of it, but increasing physical infirmities during the latter years of his life prevented him from completing what would certainly have been a most important treatise.

As an original investigator of igneous rocks, Pirsson occupies a very high position. His most important contributions centered about the smaller mountain complexes, chiefly laccolithic in character, occurring in Montana and lying easterly from the Rocky Mountains proper, the Castle, Little Belt, Highwood and Judith Mountains. The field work in these areas was done in part of W. H. Weed and Pirsson, or by Weed alone. The petrographic studies were entirely by Pirsson. The results of these investigations appeared in several bulletins of the U. S. Geological Survey and in independent papers, chiefly in the *American Journal of Science*. These studies contributed very largely to our knowledge of the laccolithic type of the igneous intrusion, explaining and confirming Gilbert's earlier classic work in the Henry Mountains. Much information was added regarding new rock types, while the characteristics of already known types were extended and light was thrown on the principles of rock classification. The work did much to substantiate and illustrate the relationships of igneous rocks leading to the concept of "petrographic province" which has played so important a role in the theories of the genesis of the igneous rock types. Pirsson later extended his earlier work by studies of igneous rock occurrences in New Hampshire, in which work he was associated with Dr. Henry S. Washington and Professor W. N. Rice. Professor Pirsson had a profound and intimate knowledge of igneous rocks. He was an accurate and painstaking observer, a clear thinker with a highly discriminating judgment. His descriptions of rocks and their occurrences were models of precise and accurate form. His long and thorough training in chemistry and mineralogy and his skill as an analytical chemist were valuable assets in all of these investigations and contributed very largely to

the completeness and extraordinarily valuable quality of his petrographic work.

He was always alert to the more philosophic aspects of his science and contributed a number of papers in this field. With other petrographers he realized very keenly the difficulties and confusions in petrographic classification, and in 1898 he joined forces with J. P. Iddings, H. S. Washington and Whitman Cross in developing the so called quantitative classification of igneous rocks. In common with his colleagues he devoted an enormous amount of thought and labor to this classifications, and there is little doubt but that he exercised a great if not dominating influence in determining the final form which this classification assumed. The basis of this classification was essentially a chemical-mineralogical one, and this fact made Pirsson an invaluable member of the group in working out the principles which were to be used in the classification. Whatever its shortcomings as a classification of rocks may be, it undoubtedly served the important purpose of directing the attention of geologists in general to a more critical evaluation of the quantitative chemical and mineralogical characteristics of rocks.

Recognition of the importance of his contributions to petrography brought him membership in many learned societies, among them being the National Academy of Sciences, the Geological Society of Sweden, the American Academy of Arts and Sciences, and the Geological Society of America, of which he was vice president in 1915. A full bibliography of his scientific papers is given in the *Transactions* of the National Academy of Sciences in a memoir prepared by J. P. Iddings.

Professor Pirsson in 1898 was appointed secretary of the Governing Board of the Sheffield Scientific School and from that time on he devoted an increasingly large amount of time to the committee and administrative work for the school. He had a very deep interest in all educational matters and this, combined with his naturally sound judgment, rendered him a valuable man in school administration.

In 1902 he married Miss Eliza Trumbull Brush, daughter of Professor George J. Brush.

Professor Pirsson was a man of the highest ideals and character, and a man of broad cultivation, widely read and interested in many

things. His students found in him a sympathetic and competent teacher; his associates, a delightful companion in a social way and an inspiring collaborator in scientific work. A very full and admirable account of his life and work has been written by his intimate friend and eminent geologist, Dr. Whitman Cross, of the United States Geological Survey, for the *American Journal of Science*, where it may be found in the issue of September 1920.

CHARLES H. WARREN.

IRA REMSEN¹ (1846-1927).

Fellow in Class I, Section 3, 1875.

Ira Remsen was for many years the outstanding figure in American chemistry. He was the first to make possible the acquisition of a thorough and broad training in chemistry in this country. The laboratory which he established soon after his return from study in Europe attracted at once many ambitious young men to pursue graduate study and research, and its success led to the development of similar facilities in other institutions.

Ira Remsen was born in New York City, February 10, 1846 and died in Carmel, California in 1927. Before the completion of the required work at the Free Academy, now the College of the City of New York, he began the study of medicine and was granted the degree of M.D. at the age of twenty-one by the College of Physicians and Surgeons. The little he learned of chemistry in his medical course aroused his interest and he forsook medicine and went to Europe to study the more exact science. He began work in Liebig's laboratory¹ in Munich and received there under Volhard his first systematic training in methods of analysis. As Liebig had given up the instruction of students, Remsen went to Göttingen, carried out a research with Fittig in organic chemistry, and was awarded the degree of Ph.D. in 1870. He went with Fittig to Tübingen to serve as his assistant for two years. On his return to America Remsen was

¹ Biographical sketches of Ira Remsen have been published in *Science*, 66, 243 (1927), *J. Am. Chem. Soc.*, 1927, 3282, *J. Am. Chem. Soc. Proceedings*, 50, 67 (1928) and *Biographical Memoirs, Nat. Ac. Sci. Vol. XIV*. The last two references contain a bibliography of Remsen's scientific papers.

appointed professor of chemistry and physics at Williams College. He set up a laboratory for himself, continued his research work, translated Wöhler's "Organic Chemistry" and wrote his "Theoretical Chemistry."

The publications of Remsen led to a call to head a department of chemistry at the recently established Johns Hopkins University. For twenty-five years he held the department in the first place among those devoted to graduate work in chemistry.

Remsen took an active part in the administration affairs of Johns Hopkins University and was called to the Presidency in 1901 on the retirement of President Gilman. He resigned his post in 1913, but his love of chemistry forced him back into the work and he accepted a consulting position in the petroleum industry. His insistence upon the need for research culminated in the establishment of a research laboratory to study the chemical problems of the industry.

Remsen and his students published a large number of papers of importance which can not be reviewed here. The training and inspiration of future chemists held a high place in Remsen's mind. He lived to see his efforts rewarded. Many of the leaders in research in chemistry in America are the products of his care; the ability to express the principles of chemistry acquired by his disciples has made many of them successful teachers.

Remsen extended his influence as a teacher by means of his text-books. His *Organic Chemistry* was a masterpiece of lucidity and logic. The book was used over the world in translations in several languages. He wrote three text-books on inorganic chemistry which remained for many years the standard texts in chemistry in America. He wrote in all eight text-books and laboratory manuals.

The accomplishments of Remsen brought him many honors. He was a Fellow of the American Academy of Arts and Sciences and honorary member of the Société Chimique de France, the Pharmaceutical Society of Great Britain, and the American Chemical Society, and honorary fellow of the Chemical Society (London). He served as President of the American Chemical Society (1902), the Society of Chemical Industry (1910), the National Academy of Sciences (1907-13) and the American Association for the Advancement of Science (1903). He was the medalist of the Society of Chemical Industry in

1904, and received the Willard Gibbs medal in 1914 and the Priestley medal in 1923. He was awarded many honorary degrees: LL.D., Columbia University, 1893; Princeton University, 1896; Yale University, 1901; University of Toronto, 1902; Harvard University, 1909; Pennsylvania College, 1910; University of Pittsburgh, 1915; D.C.L., University of the South, 1907.

Ira Remsen's ashes rest in a beautiful new laboratory dedicated to his memory and named Remsen Hall. The men who were reared as chemists by his painstaking hands have established a fund in his honor to be used in furthering research in chemistry at the university.

JAMES F. NORRIS.

WILLIAM NORTH RICE (1845-1928).

Fellow in Class II, Section 1, 1917.

A biography of Dr. Rice by L. G. Westgate will be found in the *Bulletin of the Geological Society of America*, Volume 40, pages 50-55, and in Volume 35, page 117, an account of the testimonial presented to him by his geological colleagues. The *Wesleyan University Bulletin* of January, 1929, Volume 23, Number 1, was entirely given up to appreciations of him and includes a reprint of the obituary notice in the *American Journal of Science*, January, 1929.

He was the first Doctor of Philosophy in Geology at Yale and was said to be the favorite pupil of James D. Dana, whose *Geology* he edited after his death. From 1903 to 1916 he was Superintendent of the Connecticut Geological and Natural History Survey. He was connected with Wesleyan from 1867 to 1928, being three times acting president. Other data will be found in *Who's Who*.

His scientific work was largely connected with Connecticut. He also wrote upon Bermuda and upon certain broader aspects of geology, especially with regard to the use of some of Dana's terms and the classification of mountains. He was prominent in education and religion as well as in geology and was a favorite after dinner speaker of the Geological Society, combining broad philosophical views with genial humor. Few that heard it will forget when he was rather teasingly called, about the time of the Scope trial, to speak at the Ann

Arbor dinner of the Geological Society as a clergyman, his response that Bryan was not much more wrong on evolution than on economics.

At the annual meetings of State Geologists his sound judgment and open mind, combined with sane conservatism in the use of scientific terms, was notable. It was noteworthy that a professor other than one at Yale should be superintendent of the Connecticut Survey. This showed not only the broad mindedness of his Yale colleagues but his scientific leadership and high standing.

His eminently synthetic mind is shown in those of his works which combine the religious and geological point of view: "Science and Religion," "The Return to Faith," "The Poet of Science." It was due perhaps as much to him as to any other man that the great religious denomination to which he belonged has not assumed an attitude hostile to evolution. Talking to me he one time humorously alluded to himself as the "Lord High Inquisitor," referring to the fact that he was Chairman of the Examining Committee of the New York Conference of the Methodist Episcopal Church, and told me that he knew of but one in that Conference who did not believe in evolution.

Up to nearly the very end he was an active and valued participant in the Intercollegiate Geological Excursions of New England.

ALFRED C. LANE.

JAMES HARDY ROPES (1866-1933).

Fellow in Class IV, Section 1, 1909.

Professor James Hardy Ropes, who was elected a Fellow of the Academy on May 12, 1909, died at his home in Cambridge on January 7, 1933, in his sixty seventh year.

He was born in Salem, Massachusetts, September 3, 1866, the son of William Ladd Ropes, Librarian of Andover Theological Seminary, and of Harriet Lawson (Pierson) Ropes. He graduated from Phillips Academy, with first class classical honors in 1885, and from Harvard College, *summa cum laude*, in 1889. After a year spent in field work with the United States Geological Survey, he turned to what was to become his life work as a theologian. Three years in Andover Seminary were followed by a year of graduate work in German universities.

He began his academic life as an instructor in Harvard, 1895, receiving his full professorship in 1903. For seven years from that date he was Bussey Professor of the New Testament, and in 1910 was appointed to the Hollis Professorship of Divinity, the oldest chair in the University.

Professor Ropes was ordained to the ministry of the Congregational Church in 1901, but never served as a parish minister. He was however for many years one of the unofficial ministers of religion to the University community.

Professor Ropes' name had become in these latter years a synonym for New Testament scholarship of the first rank. His published works, consisting of books and frequent articles in learned journals, were crowned by his *Text of Acts* published in 1925. This volume was instantly received and recognized in this country and in Europe as being the definitive statement and treatment of one of the most debated problems in New Testament studies. It stands in the great tradition of Biblical scholarship and is an honor to its author. Harvard University and the Academy share, humbly and gladly, in its distinction.

As a teacher Professor Ropes was a man of single mind and of austere requirements. He refused to equate pure scholarship with pious edification, and by the rigors of life in his class room did much to restore to American theology its lost lustre. Lazy men did not understand him, sentimental men could not follow him, but for those men with whom "truth is carried alive into the heart by passion" he was a trusted guide.

James Hardy Ropes was one of those men who found it hard to defend the solitude necessary to constant and productive scholarship. His friendships were wide, his circle of acquaintances much wider. The roots of his life went down deep into the whole New England community and the branches of his sympathy spread far over its present variety of interests. He was therefore drawn into many activities other than those of the study, and being a man of conscience he never allowed these collateral duties to become matters of hollow form. In such capacity he had served the University as Dean of its Department of University Extension, the corporations of both Radcliffe and Simmons Colleges as trustee. More particu-

larly he had given himself whole-heartedly to his duties as a trustee of Phillips Academy, Andover, and latterly as Chairman of that board he gave freely of time which was always precious and strength which was limited. He was a member of many learned societies and, in particular, of this Academy. His fidelity to its ideals, concerns, and companionships remains to us a gracious memory.

In 1897 Professor Ropes married Alice, the daughter of Edward Jackson Lowell of Boston, and is survived by Mrs. Ropes and by two children, Harriet and Edward Jackson Lowell.

W. L. SPERRY.

JOSIAH ROYCE (1855-1916).

Fellow in Class III, Section 1, 1891.

I.

A summary of the events and appointments in the life of Josiah Royce is contained in *Who's Who in America*, 1917. In "Papers in honor of Josiah Royce on his 60th Birthday," published in *The Philosophical Review* for May, 1916 (Vol. XXV, No. 3), a good deal of biographical material is included. His own autobiographical sketch published as the final chapter of *The Hope of the Great Community* (Macmillan, 1916), contains valuable data. George Santayana contributes his view of Royce in *Character and Opinion in the United States* (Scribner's, 1920). The *National Cyclopaedia of American Biography* contains an article on Royce (Vol. XI, p. 171), and a volume yet to be published of the *Dictionary of American Biography* will include an article on Royce by Ralph Barton Perry. The best short sketch of him that I know is that by G. H. Palmer in Morison's *Development of Harvard University*, pp. 9-15.

II.

Royce was a diligent writer. Benjamin Rand enumerates twenty-three volumes and ninety-four articles written by him. Of this output the books most apt to be read by students of philosophy in the coming years are:

The Religious Aspect of Philosophy, 1885.

The Conception of God, 1897.

The World and the Individual, 1900-1901.

By this last book his permanent importance as a philosopher will, I think, be determined.

The complete bibliography of his writings above mentioned was published by Dr. Benjamin Rand in *The Philosophical Review* for May, 1916.

III.

Josiah Royce was a shy, awkward, intensely conscientious, deeply loyal and affectionate person. From his sixteenth birthday till his death at sixty-one, he poured all the strength that he had into his work as a teacher and writer. He eked out his meagre salary by lecturing whenever opportunity offered, so as to be able not only to do his best for his wife and his two boys, but to send money to relatives in California.

Almost his only recreation was in listening to music, especially orchestral music, which he enjoyed intensely. Sometimes he spoke of symbolic logic as another recreation.

He was an omnivorous reader not only of philosophy but of general literature, novels, magazines, and newspapers. His friendships were close and enduring. He had an especial kinship and affection for children.

In philosophy he was, I believe, the most original and creative mind that American has produced. Logic and the strict analysis of meanings was the centre of his interest. The applications of this analysis in metaphysics, epistemology, cosmology, religion, and ethics make up the bulk of his writing. He never touched aesthetics, but his interest in psychology and in the history of philosophy was strong and productive.

As a teacher he did most of his work by lecturing, though in seminars he was expert in leading and conducting discussion and at interpreting the ideas of his pupils. In his earlier writings he attained, I think, considerable literary skill, but this declined as he grew more and more interested in putting his meaning so that it *could not be misunderstood*, and his later works, while more profound and exact, are less readable.

The wide range of his interests is suggested by the fact that he wrote a novel, and a history of California, worked in child study, wrote a book on psychology and a volume of essays on provincialism,

race questions, and other American problems. His patriotism was intense and active. In his last years it broke out in a series of fiery essays on the World War and America's duty to take part in it.

Disease cut short his life while still he had abundant powers and plans for future work.

RICHARD C. CABOT.

GEORGE AUGUSTUS SANDERSON (1863-1932).

Fellow in Class III, Section 1, 1930.

George Augustus Sanderson was born at Littleton, Massachusetts, on July 1, 1863, and died on June 11, 1932. His earliest Sanderson ancestor on this continent came to the Massachusetts Bay Colony in 1645 and settled in Watertown. A great grandson of this Puritan immigrant bought in 1750 the farm in Littleton which has ever since been in the possession of the family. On the distaff side, his earliest forebear settled in Ipswich in 1635 and a descendant removed to Littleton early in the eighteenth century. Every successive generation of these families was disciplined by lives of simplicity, industry and frugality. Most of them were tillers of the soil. His father, George W. Sanderson, was a man of great public spirit who was selectman, member of each branch of the Legislature, and in other ways strove to promote the general welfare.

George A. Sanderson received his early education in the public schools of his native town and in the Lawrence Academy at Groton. He graduated from Yale in 1885 and two years later from Boston University Law School. He was married in 1893 to Annie S. Bennett of Ayer. They had five children—two daughters, one of whom died in childhood, and three sons. He was survived by his widow, the sons and one daughter.

After being admitted to the bar in 1887, he practiced law in Boston. In 1893 he was appointed assistant district attorney and in 1901 elected district attorney for the northern district, which comprises Middlesex County. He continued to be district attorney until 1907, when he was appointed by Governor Guild a justice of the Superior Court. In October, 1924, he was appointed by Governor Cox a justice of the Supreme Judicial Court and discharged the duties of that position until his death.

He was an admirable prosecuting officer. He brought to its important and difficult functions a deep sense of fairness, a heart full of sympathy, and a keen consciousness of the demands of public safety. He was a close approach to the ideal as a judge of the trial court. With great patience and unruffled courtesy, he endeavored to understand the point of view of every party, witness and counsel, and to see to it that justice should prevail. He was firm in his rulings, prompt in the disposition of all incidental matters, and moved forward without delay and without haste to a final decision.

As a member of the court of last resort he manifested the traits which make for the strength and usefulness of that tribunal and which assure professional esteem and public confidence in its decisions. He possessed unrelenting industry, scholarly attainments, broad and exact knowledge of the law, a logical mind, the judicial temperament. His thought was clear and his expression was lucid. He was steadfast in his convictions, but always open to the force of more cogent reasoning. Throughout his life he continued to grow in intellectual and judicial strength and power. He was a member of the Supreme Judicial Court almost eight years. He wrote four hundred ninety-eight opinions expressive of the judgment of the court, to be found in the thirty-one volumes of Massachusetts Reports from 250 to 280, both inclusive. There is a uniformity of fine excellence in these visible contributions to the body of our jurisprudence. He was thorough and comprehensive. No argument escaped his attention. His analysis was searching, his balancing of conflicting contentions accurate, his perspective correct. He abounded in sound common sense. He discerned between the accidental and the essential, between the dominant and the ancillary. His grasp of governing principles was sure. He was a wise and upright judge.

His tall, erect, muscular figure gave him in every aspect the appearance of a distinguished judge. He was deeply attached to his native soil. His recreations kept him in close touch with the country and farm life. He enlarged his acres, and delighted in the planting and nurture of orchards. In the midst of other activities he took intense interest in the affairs of the town in which he lived. He was moderator of the town meeting and member of the school committee. He served, also, as a trustee of Lawrence Academy, a trustee of the public

library of Ayer, and a trustee of the North Middlesex Savings Bank. His family life with wife and children and kindred was most exemplary. He was a spiritually-minded man. He realized his ideals more than most men because he brought every motive and act to the test of an enlightened conscience. He was deeply religious, a constant attendant upon public worship, and senior warden of St. Andrews Episcopal Church of Ayer. He was elected a Fellow of this Academy on May 14, 1930, was frequently present at its stated meetings and much interested in its proceedings. It was the intention of the trustees of Boston University to confer upon him the degree of Doctor of Laws in 1932. Impressive reference was made to him at the Commencement although he had passed away a few days before. His life was a reflection of the best in our citizenship, raised by the merit of personal achievement to high judicial station. He left the world better for his having lived.

ARTHUR. P. RUGG.

HENRY NEWTON SHELDON (1842-1926).

Fellow in Class III, Section 1, 1913.

Henry Newton Sheldon was elected a Fellow of the Academy on May 14, 1913, while one of the Justices of the Supreme Judicial Court of Massachusetts.

He was a son of David Newton Sheldon, a Unitarian minister who for ten years was President of Waterville, later Colby, College. He was an older brother of Edward S. Sheldon, Professor of Romance Philology at Harvard. He was born at Waterville, Maine, June 28, 1842. After a year at Bowdoin College he entered the sophomore class at Harvard in 1861 and graduated at Harvard at the head of the class with the bachelor's degree in arts in 1863. His studious habits and brilliant scholarship earned him the title "The Sluggard," by which his classmates always remembered him. Among those classmates were John Fiske, Francis Amory, Charles Pickering Bowditch, Frederic T. Greenhalge, John T. Hassam, George S. Morison, George B. Shattuck, Clement L. Smith, John Collins Warren, men difficult to surpass even in their college years. On leaving college he taught for a time, but the Civil War claimed him. On his birth-

day anniversary in 1864 he was commissioned Second Lieutenant in the Fifty-fifth Massachusetts regiment. In December of that year he was made first lieutenant. He remained with his regiment till mustered out in September, 1865 at the close of the war. His soldiers, colored men, revered him. One can feel them gathering renewed courage after a shattering repulse at Cold Harbor from looking at him as he sat on the breast-works amid the missiles of death calmly smoking his pipe while they rallied and again took up the fight. Small in body, he was great in soul.

He had studied law while teaching and in the army. He was admitted to the bar March 12, 1866. He entered the office of Judge Josiah G. Abbott. He was married to Clara P. Morse in 1867. Their son Wilmon Henry Sheldon is now Professor of Philosophy at Yale. He associated himself with General Wilmon W. Blackmar in the law firm of Blackmar & Sheldon at Boston. Both, in 1865, had been among the founders of the Loyal Legion, formed upon the death of President Lincoln and dedicated to the ideals for which that great man had lived and died.

He was more successful in rendering notable service to clients than in gathering clients about him. Nevertheless his office did a good business. The ease and rapidity with which he dealt with his clients' affairs, left him time to write for the *American Law Register*, to prepare his work on Subrogation published in 1882, still a standard on the subject, and to edit an edition of Bateman, on "Auctions." Perhaps his modesty would have prevented a general recognition of his great learning and ability as a lawyer, had not his classmate, Greenhalge, been elected Governor of Massachusetts. Called on to nominate a Judge for the Superior Court, Governor Greenhalge presented the name of Henry N. Sheldon and urged the friends of "The Sluggard" to get together in his behalf. The nomination was confirmed; and, in 1894, Judge Sheldon began his judicial career. His merits were speedily recognized. Rapid, clear, solid, his mind dominated his court room; and parties, lawyers, juries, were satisfied that here was a judge of ideal excellence. In 1897 Governor Wolcott appointed him chairman of a commission of three to investigate and report upon a plan for the simplification of criminal pleadings and to prepare a schedule of forms. This work, to which he contributed

largely, brought about a vast improvement in criminal pleading which has placed the Commonwealth as the leader in one of the reforms most needed by the law. In 1905 he was appointed to the Supreme Judicial Court. In 1908 Harvard conferred upon him its degree of Doctor of Laws. His work in writing of opinions, in consultation, and in such *nisi prius* matters as came to the judges of that court, all added to the reputation for learning and ability earned in his earlier positions.

His memory was remarkable. His reading in all branches of knowledge was extensive. His powers as a mathematician were extraordinary. A matter once passed through his mind was there to stay; and to be recalled and utilized at will on a moment's notice. But there was nothing of the pedant about him. The record of a base ball player was as readily placed at the service of a friend as the words of a Latin or Greek classic or of a great poem in English, French or German, or the volume and page of a law case.

He loved the national game and knew its players and their records. He was a skilful player of chess. The writer recalls the wonder—and humiliation—he felt as he moved chessmen about and saw Judge Sheldon play with him and them.

He retired from the court in 1914; but continued to render service to the law. In 1915 he was President of the Massachusetts Bar Association. He took a leading part in the work of the grievance committee of the Bar Association of the City of Boston, aiding in clearing up a blot on our records of the Bar. In 1919 he served as chairman of a judicature commission which made valuable suggestions for the improvement of our judicial system.

He died January 14, 1926, a scholar, a soldier, a judge, and a man.

WILLIAM C. WAIT.

ALEXANDER SMITH (1865-1922).

Fellow in Class I, Section 3, 1914.

Alexander Smith was born in Edinburgh in 1865. He was the son of Alexander Smith and Isabella Carter Smith. His grandfather of the same name was a sculptor and his father, after studying modeling in clay, became a musician. Many members of our Academy will

remember that the father of Theodore William Richards was a distinguished artist. There is certainly a close relation between those qualities of initiative which characterize a great artist and similar qualities which contribute to scientific work of originality and importance.

Alexander Smith graduated from the University of Edinburgh with the degree of B.Sc. in chemistry in 1886. His studies had been devoted to astronomy more than to chemistry. He found, however, that there would be almost no chance for him to secure a position which would give him an independent career in that science and he went to the laboratory of Adolph v. Baeyer in Munich to study organic chemistry. At Edinburgh and Munich he secured thorough training in inorganic and analytical chemistry and after completing an experimental study of the 1, 3-diketones under the direction of Ludwig Claisen he received the degree of Ph.D. in 1889. He returned to Edinburgh for a year as an assistant in qualitative analysis. He also gave a course of lectures on organic syntheses.

During the summer of 1890 Dr. Smith came to America and was proposed as a candidate for the chair of chemistry at Wabash College, Crawfordsville, Indiana. Wabash College was founded under Presbyterian influences and Dr. Smith, with his thorough training, Scotch descent and attractive personality, proved very acceptable to the Board of Trustees and was appointed. He spent four very successful years at Crawfordsville, paying very careful attention to his work as a lecturer and teacher. At the same time he continued research work in organic chemistry and published four papers of his own and two with students upon work in that field begun at Crawfordsville.

In 1894 he was called to the University of Chicago as assistant professor of chemistry in charge of the instruction in elementary inorganic chemistry. He now turned his attention to a very careful study of the methods of instruction for beginners in chemistry and to researches in inorganic and physical chemistry. His previous thorough training in mathematics, physics and astronomy gave him an admirable training for work in these fields.

In 1900 he published "A laboratory outline of general chemistry," which soon passed through four editions and was translated into

German, Russian and Italian. In 1902 he and Edwin H. Hall of Harvard published "The teaching of chemistry and physics in the secondary school." This is still one of the best books we have on the subject. In 1906 he published his "Introduction to general inorganic chemistry." In this the modern theories of solutions and of equilibria were adequately presented for the first time in an introductory English text-book. This book was phenomenally successful and has passed through many editions. Since Dr. Smith's death the book has been revised by James Kendall. It has been translated into German, Russian, Italian and Portuguese. Several other books which he wrote still have good sales.

His first important research in physical and inorganic chemistry was an exhaustive and classical study of the forms of sulfur. By the application of Raoult's law he was able to explain the relation between the melting points and composition of mixtures of insoluble amorphous sulfur and soluble sulfur, and by a study of the catalytic effects of various substances he cleared up many inconsistencies in the reports of previous observers.

With A. W. C. Menzies he devised new and accurate methods for the determination of vapor pressures, which were especially useful at high temperatures. By means of these methods it was demonstrated that mercurous chloride dissociates completely to mercury and mercuric chloride when it is changed to the vapor phase.

In recognition of these two researches, Professor Smith was awarded the Keith prize and medal of the Royal Society of Edinburgh in 1912.

In 1911 he was called to the chair of chemistry and head of the department of chemistry at Columbia University, succeeding Professor C. F. Chandler, who had retired the previous year. In 1919 he retired because of failing health. He died in Edinburgh, September 8th, 1922.

At Columbia University he and his collaborators devised methods for determining the pressure of the *saturated* vapor of ammonium chloride and demonstrated that the dissociation to ammonia and hydrochloric acid does not exceed 67 percent at 280° to 330°.

Professor Smith published 10 papers giving an account of researches in organic chemistry, 26 in inorganic and physical chemistry, 4 in astronomy and 21 on miscellaneous topics, chiefly on the teaching of

chemistry. A detailed list of his papers and books will be found in the biographical memoir published by the National Academy of Sciences in 1927.

He was President of the American Chemical Society in 1911, was elected a member of the Royal Society of Edinburgh in 1891, an honorary foreign member of the Sociedad Española de Física y Química of Madrid in 1911, a member of the American Academy of Arts and Sciences in 1914 and of the National Academy of Sciences in 1915. In 1919 he was given the degree of LL.D. by the University of Edinburgh.

In 1905 Professor Smith married Sara Potter Bowles, of Memphis, Tennessee. There are two children, Isabella Carter Smith and William Bowles Smith.

The following characterization is quoted from the biographical memoir published by the National Academy of Sciences:

"To those who knew him best Professor Smith was a valued and loyal friend, a kind and considerate husband and father, with the highest ideals in his personal life and with a broad human interest in art and literature and in many fields of science other than chemistry. His knowledge was broad and profound, and his keen wit, quickness of repartee, and the epigrammatic quality of his remarks made conversation with him stimulating in a high degree. He has left a deep impression on many students who worked with him. The science of chemistry in America and in the world has been enriched by his labors as a teacher and as an investigator."

WILLIAM ALBERT NOYES.

WILLIAM HOWARD TAFT (1857-1930).

Fellow in Class III, Section 1, 1914.

William Howard Taft, twenty-seventh President of the United States, was born in Cincinnati, Ohio, September 15, 1857. He went from Woodward High School, Cincinnati, to Yale University from which he graduated, the second in his class, in 1878. Returning to Cincinnati, he studied law in the Cincinnati Law School, receiving the degree of LL.B. in 1880. Immediately admitted to the bar, for a year he was law reporter for two Cincinnati newspapers and for two

years, from 1881 to 1883, was assistant prosecutor of Hamilton County, Ohio. He then engaged in the private practice of the law until 1887, when he was appointed by Governor Foraker to fill a vacancy upon the bench of the Superior Court of Cincinnati. Upon the expiration of the term for which he had been appointed, Mr. Taft was elected as his own successor, the only office which he ever held by election until he became President of the United States in 1909.

In 1890, President Harrison appointed Mr. Taft, Solicitor General of the United States. His success in this office was so marked that upon the passage of the Federal Court of Appeals Act in 1892, Mr. Taft was made a Circuit Judge for the Sixth Circuit, comprising Ohio, Michigan, Kentucky and Tennessee. For nearly the whole time before he went to the Philippines, Mr. Taft was presiding judge of the Circuit Court of Appeals, and frequently sat in the Federal District Court in the trial of jury cases.

In 1896, Mr. Taft was one of a group of judges and lawyers, who, dissatisfied with the legal education given in the Cincinnati Law School, established the Law Department of the University of Cincinnati. The new school, of which Mr. Taft was made the dean, adopted the Langdell case method, one of the earliest expressions of the advancing esteem for Dean Langdell's ideas which has now become country wide. Within the year the success of the new school was so great that a consolidation was effected. Mr. Taft continued as dean and professor of the law of Property until he resigned his judgeship to go to the Philippines. His interest, notwithstanding the pressure of judicial duties, never flagged and he seldom missed his class appointments.

In 1900, Mr. Taft was appointed as the head of the Second Philippine Commission, charged with the duty of establishing civil government in the Islands. The succeeding year he became the first Governor General and remained in that position until 1904, when he became Secretary of War in President Theodore Roosevelt's cabinet.

In 1908, Mr. Taft was the candidate of the Republican Party for the Presidency of the United States and was elected. In 1912, he was again a candidate but met defeat. Upon the expiration of his term, Mr. Taft became Kent Professor of Constitutional Law in Yale University and in the same year was elected President of the American

Bar Association. His work as teacher, lecturer and advocate of causes, such as the League to Enforce Peace, occupied him until in 1921 he was appointed Chief Justice of the United States. He resigned, owing to failing health, on February 3rd, 1930 and his death followed quickly on March 8th.

Mr. Taft was elected a Fellow of the American Academy of Arts and Sciences on January 14, 1914, and continued as such until his death.

A bald recital such as this is not an adequate tribute to Mr. Taft's great public services, but space will not permit the consideration of his work as judge, administrator and statesman, nor does it allow anything more than a mention of his warm and attractive personality.

In addition to many addresses and lectures printed in scattered places, Mr. Taft was the author of the following books:

Presidential Addresses and State Papers, 1910.

Popular Government, 1913.

The Anti-Trust Act and the Supreme Court, 1914.

The United States and Peace, 1914.

Ethics in Service, 1915.

Our Chief Magistrate and His Powers, 1916.

His opinions as a member of the Circuit Court of Appeals for the Sixth Circuit are to be found in volumes 49-100 of the Federal Reporter and in volumes 1-40 of the United States Circuit Court of Appeals Reports. Mr. Taft's opinions as Chief Justice of the United States are contained in volumes 257-280 of the United States Reports.

ELDON R. JAMES.

ROLAND THAXTER¹ (1858-1932).

Fellow in Class II, Section 2, 1892.

Roland Thaxter was born in Newton, Mass., on Aug. 28, 1858, and died in Cambridge, Mass., April 22, 1932. His father, Levi Lincoln Thaxter (A.B., Harv. 1843, LL.B. 1845), aside from his professional training in the law, was of literary tastes and an authority on the life and works of Browning. His mother, Celia (Laighton) Thaxter, was well known for her poems of nature and her deep

¹ Compare the biography by W. H. Weston, Jr. in *Mycologia*, 25: 69-89, pl. 16, 17, Ma.-Ap. 1933.

religious sympathies. Thaxter attended various schools in Boston and Cambridge, entered Harvard in 1878 and received the degree of A.B. *magna cum laude* in 1882. After nearly a year of illness, but during which he published two of his short papers on insects, he completed (1883-1884) a year at the Harvard Medical School. Receiving a two-year Harris Fellowship, however, he transferred to the Graduate School of Arts and Sciences, concentrating on research work in cryptogamic botany under William Gilson Farlow. From 1886-1888 he was Assistant in Cryptogamic Botany at Harvard and from 1888 to 1891 Mycologist to the Connecticut Agricultural College at New Haven, whence he was recalled to Harvard as Assistant Professor of Cryptogamic Botany. He was advanced to Professor in 1901 but retired to the position of Professor Emeritus and Honorary Curator of the Farlow Herbarium in 1919, in order to devote his entire time and energy to his life work. Thaxter was married on June 8, 1887, to Mabel Gray Freeman of Springfield, Mass., who, with three of their four children, Katherine, Elizabeth, and Edmund Lincoln (A.B., Harv. 1922), survives him. The Thaxter home was at Kittery Point, Maine, a locality rendered classic by him because of the numerous types of fungi he described from it, but his Cambridge residence was long fixed at 7 Scott Street.

Thaxter, inheriting literary, artistic and nature-loving tendencies, early developed along biological lines, his major attraction at first being entomology. Between 1877 and 1884 he published 5 short papers on insects. His attention then turned towards fungi and his cultures of the rusts on alternating hosts of *Cupressoidae* and *Pomoidae*, commonly known as "Cedar-apples" (*Gymnosporangia* and *Roestelia*), undertaken as a problem under Farlow, occupied some of his attention during 1886 and 1888 and even extended to 1890.

In 1888 Thaxter began what we may suppose he expected to complete in a comparatively few years, but which became his life work, with the publication of "The Entomophthorae of the United States," presented as his doctor's thesis. With the separates, Thaxter enclosed a printed slip announcing his desire "of extending the present paper so as to include all the Entomogenous fungi of North America" and his wish "to procure by exchange or otherwise as large an amount of material for comparison as possible" and "information concerning

fungus epidemics among noxious insects." In this paper Thaxter extended the species of Entomophthores from the four previously known to 27, the great majority of which were new. The Entomophthoreae were further results of his labors during 1886 and 1887, and the culturing, preparation of slides and execution of the remarkable series of drawings, were all of the high grade of care and skill that characterized his later work.

The second group of entomogenous fungi was the *Laboulbenia* group, which in his first publication (in the Proceedings of this Academy) he evidently considered to be "a small group of fungi," consisting of 15 described species distributed through five genera, only one species of which was known from North America. The number of new species and genera, based upon discovery of an increasingly varied morphology, segregation of sex, and behavior on the part of these amazing ectoparasites of beetles, flies, etc., led to the publication by this Academy of some 20 papers in the Proceedings and five portions of the projected monograph in the Memoirs. All of his *Laboulbenia* papers are thus seriatim to be found in the Academy's publications. He was working on the final portion of the monograph (Part VI) at the time of his death.

Thaxter brought the "small" *Laboulbenia*-group to recognition as an order, segregated into at least three distinct families and containing somewhere about 80 genera and, in turn, represented by about 1500 well marked species. The gigantic task of collecting or assembling from the larger and smaller entomological collections of the world, this immense number of species, of many individuals each, of mounting these minute plants in fixed positions on the microscope slides, of outlining them with the camera lucida, of filling in the details of the structures, of preparing the final plates (each drawn complete in itself) could not have been accomplished in so exemplary a fashion except by skill, ingenuity, keen insight and untold application. The interpretation appears most masterly and there is provided knowledge of a large group of entomogenous Ascomycetes in such detail and closely approximate completeness as to furnish a new link in the discussion of the phyletic and relations of ascomycetous fungi. The published drawings alone, restricted to 1, 2, or very few for each species, number approximately 3367 and yield to scrutiny of other

mycologists a wealth of detail of variance as a basis for study and generalization. It is largely on account of the contributions toward a knowledge of Laboulbeniales that Thaxter was, early in his work, awarded the "Prix Desmazieres" by the French Academy.

The third great group in the trilogy of entomogenous fungi, that of *Cordyceps* and its conidial stage of *Isaria*, never arrived at publication. Thaxter published (1914) a single short paper on the ascosporic condition of *Aschersonia*. His collections and cultures were, however, numerous and to others interested in the study of these plants, he communicated notes and criticisms of great service and value.

While Thaxter's life work was largely on the Laboulbeniales, his interests were extended to all Cryptogamic groups. On algae, he published a single paper (*Compsopogon*, 1900); on lichens, of which he had large knowledge, also a single paper (*Myxotheca*, 1927); on mosses, which he also knew well, nothing. Primarily he was a mycologist, collecting, culturing, and following through life histories of innumerable forms, only a few of whose results came to publication. He discovered, illuminated and championed the remarkable and puzzling group of the Myxobacteriaceae (1892, 1893, 1897, 1904); in Zygomycetes he published three papers (1895, 1897, 1914) on new or peculiar forms, and a revision of the peculiar Endogonaceae (1922); in Oomycetes, on aquatic fungi, five papers (1894, 1895, 1896) and a new American *Phytophthora* (1889) on lima beans; on Hyphomycetes three papers (1891, 1903); on fleshy Ascomycetes two papers (1905, 1922); and one on a peculiar phalloid genus (*Phallogaster*, 1893). As mycologist to the Experiment Station of Connecticut he published (1889, 1890) on "injurious fungi," "fungi and fungicides," on "potato scab," and other more economic aspects of mycology.

As a teacher, both of more elementary cryptogamic botany and of graduate and research grades, he was meticulous as to method and exposition. Himself a master of delicate and skilful technique, he was appalled by clumsy methods and slovenly attack. With research students of ability he was most appreciative and helpful, but sternly exacting. Nearly one thousand students of various grades felt his contact.

His travels were ever for botanizing or for inspection of extensive collections of insects or fungi, particularly the former in search of

Laboulbeniales. The larger collections of Europe and America were visited. From Newfoundland to Florida, he carried on his work and into the West Indies. Southern South America saw him in 1905-1906, active in cryptogamic pursuits, collecting algae, lichens, and mosses, but most particularly fungi. His eye was keen and his attention minutely concentrated on forms to be expected or more or less vaguely indicated by others.

Honors came early and often to Roland Thaxter. Of the more usual American professional societies of which he was a member, he was chosen as President by his colleagues of the Botanical Society of America, the New England Botanical Club, and the American Mycological Society. He was early chosen a Fellow of this Academy, was a member of the American Philosophical Society and of the National Academy of Sciences. His European memberships were numerous, including the Linnean Society of London, of Lyons, the British Mycological Society, the Botanical Society of Edinburgh, the Royal Botanical Society of Belgium, the Deutsche Botanische Gesellschaft, the Russian Mycological Society, the Danish Royal Academy, the Swedish Royal Academy, and the Institut de France (Academy of Sciences).

WILLIAM ALBERT SETCHELL.

WILLIAM SYDNEY THAYER (1864-1932).

Fellow in Class II, Section 4, 1921.

Born in Milton, Massachusetts, June 23, 1864, son of James B. and Sophia Ripley Thayer, William Sydney Thayer soon moved to Cambridge, where he was educated in a Harvard atmosphere, his father being a professor in the Harvard Law School, graduating in arts with membership in Phi Beta Kappa in 1884 and receiving his M.D. in 1889. Throughout life Dr. Thayer evidenced a scholarly attitude of mind. Familiar with the classics and facile in acquiring the use of modern languages, such as German, French, Italian and Russian, in his medical career all that he said or did showed the influence of the arts on his science and withal in a man by nature courteous and courtly, obviously reared in a family of culture and refinement.

After receiving his M.D. from Harvard Dr. Thayer served as house pupil in Medicine at the Massachusetts General Hospital and shortly after this migrated to Baltimore to become intimately associated with Sir William, then Doctor, Osler. For nearly eight years he resided in the Johns Hopkins Hospital, for seven being resident physician, at that time an unheard of experience in American Medicine, for only at the Johns Hopkins Hospital had been established then a system of a senior group on the resident staff, permitting to any one that thorough clinical training possible to the man living his life within the hospital walls, witness of the innumerable phenomena of disease, that occur at any part of the twenty-four hours in the many beds within the hospital. It might be added that, since then, it has remained rare for anyone to spend so long a time a member of the resident staff of a hospital.

With this foundation is it any wonder that Dr. Thayer became the clinician par excellence, a teacher of clinical medicine to generations of students as associate professor, professor of clinical medicine, professor of medicine and professor of medicine emeritus in the Johns Hopkins Medical School and physician and physician-in-chief to the Johns Hopkins Hospital and a widely sought consultant in internal medicine?

Dr. Thayer was an active contributor to medical literature with 179 titles in his collected reprints covering a wide range of medical subjects. His earlier work were studies of the blood, notably in leukemia, typhoid and malaria. Later his attention was turned to cardio-vascular disease with important studies published on the circulatory complications of typhoid fever, on the third heart sound, on chorea, arteriosclerosis, heart block, and various forms of endocarditis. Medical history and essays of non-medical interest, charming verse and significant public addresses are included in his bibliographic titles.

Dr. Thayer received many honors at home and abroad. He was president of the Association of American Physicians, of the American Medical Association, and of the Phi Beta Kappa at Harvard; member of all of the important American medical societies; associate member of the Academy of Medicine, Paris; honorary fellow of the Royal College of Physicians of Ireland, Royal Society of Tropical Medicine

and Hygiene, London, Royal Society of Medicine, London, Royal Medical Society, Budapest, and New York Academy of Medicine; honorary member of Association of Physicians of Great Britain and Ireland, Therapeutic Society of Moscow, and International Society of Medicine and Hydrology; honorary corresponding member of Société des Hôpitaux, Paris; corresponding member Wiener Gesellschaft für Innere Medizin and Kinderheilkunde, Soc. des Hôpitaux de Lyon and Soc. Royale des Sc. med. et nat. de Bruxelles. He was a Fellow of the American Academy of Arts and Sciences and American Philosophical Society. He was Commander of the Legion of Honor of France. He received numerous honorary degrees; LL.D. from Washington College, Edinburgh University, McGill University; honorary Dr. from Univ. of Paris; ScD. from University of Chicago. He was a member of the Board of Overseers of Harvard and a trustee of the Carnegie Institution of Washington.

During the war he became Chief Medical Consultant of the United States Expeditionary Force in France with the rank of Brigadier General and received a Distinguished Service Medal in 1919. He served as the head of an American Red Cross Mission to Russia in 1917-18.

In his later years Dr. Thayer came to be very generally known as America's best representative of clinical medicine and as such was called upon to represent America in important foreign medical or academic functions. In such capacity he delivered an address on the contributions of Pasteur to Medicine and Humanity at the Sorbonne in 1923, on Laennec at the Paris celebration of the centenary of Laennec's birth in 1926, on Richard Bright on the occasion of Bright's centenary celebration at Guy's Hospital, London, in 1927, and in 1930 he delivered the Gibson lectures at Edinburgh.

In 1901 Dr. Thayer married Susan Chisolm Read, of Charleston, South Carolina, a lovely woman of great charm, who graced his home and cemented all the stronger the many ties of friendship that Dr. Thayer was ever forming. In her latter years invalided by reason of heart disease she carried on cheerfully and in 1917 faced the supreme test of insisting that Dr. Thayer serve his country by going to Russia on a Red Cross Mission realizing full well that in all probability she could not live until his return but believing that she in this was doing

her bit to the cause dear to her heart by sending the one dearest to her to do what he best of all could do. Her anticipation was all too true, for she died in 1917 while Dr. Thayer was in Russia. In 1927 wishing to do honor to Dr. Thayer a group of his friends and former pupils endowed the "William Sydney Thayer and Susan Read Thayer Lectureship in Clinical Medicine" at the Johns Hopkins, most appropriately linking in this way in perpetuity these two names.

Dr. Thayer was a rare man of unique personality—simple, courtly, courteous, lovable, just, tolerant and of unalterable integrity; to many patients he was both wise physician and helping friend; to physicians and particularly young physicians he was the exemplar of all that is best and at the same time an approachable loved person ready to help with sane advice and with wisdom from his great store of clinical knowledge; to his former pupils he was all this and more, the ever cherished friend.

HENRY A. CHRISTIAN.

FREDERICK JACKSON TURNER (1861–1932).

Fellow in Class IV, Section 2, 1911.

Frederick Jackson Turner was born of New England stock on November 14, 1861, in Portage, Wisconsin. His father, Andrew Jackson Turner, was a prominent newspaper editor and state legislator. Frederick's early life was spent in a community that had but recently been on the frontier, a background that gave realism to his later historical thought. He was educated in the public schools of his state and graduated with honors from the University of Wisconsin in 1884. At Johns Hopkins University he was introduced to the seminar method by Herbert Baxter Adams, and was granted the Ph.D. degree in 1890. For eighteen years (1892–1910) he was Professor of American History at the University of Wisconsin, and from 1910 until his retirement in 1924, Professor of History at Harvard.

As a scholar, Turner's influence upon the writing of American history was profound. In 1893 he read before the American Historical Association an essay on the "Significance of the Frontier in American History." In this short paper, the most influential ever written

on American history, Turner stated his thesis: that the continuous movement of civilization into the wilderness, the progressive advance of the frontier, released those forces which have produced the most characteristic features in American history and life. This essay made necessary a reappraisal of the forces of American history, a process of revision which is still going on.

A second seminal idea contributed by Professor Turner was the concept of the geographical section. He conceived of the section as the product of the interaction of man and environment, of population stock and physiographic province. The nation he considered a union of sections. He described American political and constitutional history as the result of the interplay of sectional forces.

As an author Turner's genius was expressed less in extended volumes than in brief suggestive essays, which induced others to continue their researches. In 1920 he gathered together a number of his essays, dealing with the concept of the frontier, into a volume entitled *The Frontier in American History*. His volume on *The Rise of the New West* (1906) is one of the outstanding works in the American Nation Series. After his retirement from active teaching in 1924, he suffered much from ill health; at the time of his death (at San Marino, California, March 14, 1932) his last book, *The United States, 1830-1850, The Nation and its Sections*, was nearly completed.

As a teacher, no less than as a writer, Turner's influence was exceptional. At the University of Wisconsin and at Harvard, he trained successive generations of scholars, who gave proof of his powers as a teacher by their contributions to the field of history. He was particularly effective in the training of graduate students who were capable of seizing his pregnant suggestions and developing them. He imbued them with his own conceptions of work and thought: the multiple hypothesis in history, the tentative nature of historical conclusions, and the imperative need of integrating the historical with the other social sciences. It was one of his distinctive modes of historical presentation to correlate political with geographic, economic, and social forces by specially prepared maps. He enhanced by a singularly gracious personality the intellectual stimulus of his thought.

S. E. MORISON.

HENRY PICKERING WALCOTT (1838-1932).

Fellow in Class II, Section 4, 1889.

Henry Pickering Walcott, A.B., LL.D., M.D., was born in Hopkinton, Mass., December 23, 1838, the son of Samuel B. and Martha (Pickering) Walcott. In 1865 he married Charlotte E. Richards of Boston, who died in 1878. A son, Robert Walcott, associate justice of the Third Eastern Middlesex Court of Massachusetts, survives.

Dr. Walcott died at his home in Cambridge on November 11, 1932, aged 93 years. He inherited a sturdy frame and rugged health and his longevity permitted him to serve long and well up to his retirement from active life, which was but a few years before his death. His sterling worth was soon recognized by those with whom he came in contact. He saw with unusual clearness into the core of difficult problems and complex situations. He hated sham and possessed in full measure a rare quality of common sense. This served him and his community to good purpose, for he had many important decisions to make during a trying time of rapid change and progress in the science of sanitation and the art of medicine.

Dr. Walcott dedicated his life to service to his fellow men. His many positions of trust and importance attest the vigor of his industry as well as the variety of his responsibilities. His long career of usefulness was in the varied fields of medicine, education, sanitation, hygiene, economics, horticulture and hospital administration.

Chief among his interests and foremost among his contributions were his constructive leadership as Chairman of the Massachusetts State Board of Health, which under his guidance achieved international recognition; as pilot of the destinies of the Massachusetts General Hospital, which under his presidency became a hospital of hospitals, a teacher of teachers; and his services to Harvard University as Overseer, Fellow and Acting President. Dr. Walcott became a member of the State Board of Health only thirteen years after its formation and served thirty-three years, twenty-nine of them as Chairman. He served through that difficult transitional stage of progress in public health which saw bewildering progress in

the sanitary sciences and which called for calm judgment and judicial balance. He gave communities clean water supplies, looked after the proper disposal of sewage and wastes, and promoted studies in these subjects which made the work of the State Board of Health a model and its publications classics which had influence upon health administration far and wide. The value of his work to the Commonwealth is expressed in a sentence taken from a letter written by Calvin Coolidge, then Governor of Massachusetts, to Dr. Walcott on his retirement: "If the public health is good and the sanitary laws wise, to you belongs the credit."

Further recognition of the eminence he reached in the minds and hearts of his colleagues is attested by the fact that he was President of the Massachusetts Medical Society, American Public Health Association, Massachusetts Horticultural Society and the American Academy of Arts and Sciences; President of the Fifteenth International Congress of Hygiene and Demography; Honorary Fellow of the Royal Sanitary Institute of Great Britain; trustee of the Carnegie Institution of Washington. He had been President of the Cambridge Hospital; Health Officer of the Massachusetts Board of Health, Lunacy and Charity, Chairman of the Metropolitan Water and Sewerage Board, a member of the first Metropolitan Drainage Commission and of the commission on the drainage of the Blackstone River, City Physician of Cambridge, and a member of the commission appointed to study the water supply of that city. He was honored with the Boylston medical prize.

Dr. Walcott's patriotism, zeal and spirit may well be inferred by his impatience at the age of twenty-three to serve in the Civil War. To accomplish this he left Harvard for Bowdoin that he might the sooner graduate in medicine. He had many friends because he was a friend. He had a scholarly habit of mind, a keen appreciation for research, an intuitive faculty for finding the best, and keen discrimination. He had an unusual memory, the saving grace of humor and was fond of companionship. Dr. Henry Pickering Walcott has taken an abiding place as a star of first magnitude in the galaxy of Massachusetts' distinguished sons.

M. J. ROSENAU.

HERBERT LANGFORD WARREN (1857-1917).

Fellow in Class III, Section 4, 1905.

Herbert Langford Warren was born in Manchester, England, March 29, 1857, and died at his home in Cambridge, Massachusetts, June 27, 1917.

He was the son of Samuel Mills Warren, of New England Colonial ancestry, and Sarah Anne (Broadfield) Warren of the Broadfields of Bridgenorth, Shropshire, England.

His school days were spent in Manchester except for two years (1869-71) in Germany where he received a thorough grounding in the German language. He studied at Owen's College, Manchester, from 1871 to 1875, and then entered the office of a Manchester architect as draughtsman. He came to this country in 1876.

From 1877 to 1879 he studied architecture at the Massachusetts Institute of Technology, then entered the office of H. H. Richardson in Brookline where he remained until 1884. He also at this time took courses in the fine arts as a special student at Harvard College. The year of 1884 was spent in travel in England, Italy and France, studying, sketching and measuring, particularly the country churches of the region in France which has been devastated by the World War. During the last of his life he felt deeply the destruction of these beautiful buildings and dreamed of sharing in the work of re-building.

On his return to Boston in 1885 he started an independent practice as architect under the firm name of Warren, Smith & Biscoe, later Warren & Smith, with an office also in Troy, New York. Many church edifices, institutional buildings and important residences were designed by his firm, and for nearly forty years he maintained a connection with the practice of his profession, but during the later years much of his time was given up to what he considered the greater work of administrative officer in Harvard University and teacher there of his art. In 1893-94 he served as Instructor, from 1894 to 1899 as Assistant Professor, from 1899 to 1903 as Professor, and from 1903 to his death as Nelson Robinson, Jr., Professor of Architecture. He also lectured on Architectural History at the Massachusetts Institute of Technology.

Under his leadership instruction in architecture grew in importance

and the number of staff and students at Harvard increased largely, until from a small beginning in the Lawrence Scientific School, the School of Architecture and School of Landscape Architecture became established and housed in a building designed to serve their needs. At his death he had served the University nearly twenty-five years. Not so much as a practitioner, therefore, will his memory live, but as scholar and teacher and eminent authority on the historical development of architecture.

His active participation in various professional and quasi professional organizations showed the breadth of his interests and sympathies. He served for three years as Director of the American Institute of Architects, for four years as Secretary of the Boston Society of Architects, was a trustee of the American Academy in Rome, President of the National League of Handicraft Societies for four years, and President of the Boston Society of Arts and Crafts from 1904 until his death.

He was also an interested member of the Archæological Institute of America and a Fellow of the American Academy of Arts and Sciences. In 1902 Harvard University conferred upon him the honorary degree of Master of Arts.

It was my good fortune as a younger man while Warren was at H. H. Richardson's office to be closely associated with him and to know him most intimately, in fact, he had a private room at the end of the office and he took me in to work under him and with him. What greatly impressed me was his tremendous enthusiasm and concentration in the architectural problem on which he was working and his singlemindedness and devotion to beauty and his art.

I always had a feeling that Warren was a Goth at heart, and yet the work at Richardson's office was Romanesque and it was quite interesting to see how by purely intellectual processes he produced such good Romanesque drawings, and he worked on many of Richardson's important buildings. In after years what was closest to his heart was propounding and elucidating to his pupils the intricacies and beauties of the Gothic Cathedrals, which he did in a most masterly manner.

In our discussions even at that early time he displayed a surprising familiarity with general history and literature besides architectural

knowledge, which in after years fitted him so peculiarly well as a scholar and teacher to develop the Architectural School at Harvard and stamp it with the highest standard in the history and principles of architecture and kindred arts.

He was a man of intense feeling, so much so that at times it drew heavily on his vital energy, and with a slight physique it was only his indomitable will and desire to do the highest and best thing possible that carried him successfully through his many and distinguished accomplishments.

CHARLES A. COOLIDGE.

JOHN WARREN (1874-1928).

Fellow in Class II, Section 4, 1921.

John Warren, the second of that name, was born in Boston in 1874, the elder son of Dr. John Collins Warren. After early preparation at Mr. Noble's School, he graduated from Harvard College with the class of 1896. With his long line of medical progenitors—Dr. John Warren, the first Professor of the Harvard Medical School; the first Dr. John Collins Warren; Dr. Jonathan Mason Warren; the late Dr. John Collins Warren—with such ancestors it was almost inevitable that he, too, should follow the medical profession, and he entered immediately the Harvard Medical School to graduate in 1901. The practice of medicine or surgery, however, was of little interest to him, and he turned to the study and teaching of anatomy.

In the Department of Anatomy of the Harvard Medical School, under Professor Thomas Dwight, a kinsman of the Warrens, John Warren rose from Demonstrator in 1901, Assistant Professor in 1908, to Associate Professor in 1915, when at Dr. Dwight's death he took charge of the anatomical teaching. He showed his deep knowledge of his chosen subject in his clear and forceful lectures and in his skillful dissections.

The pervading idea of his work was always to help the student in mastering the science which he recognized as difficult, but which seemed to him so important in medical and surgical practice. His was always the point of view of a teacher, and this led him to plan and install a teaching anatomical museum, named by him the Dwight

Room, close to the dissecting rooms and immediately available to the students. Most of the specimens displayed are the result of his own skill, and form the basis of the illustrations for an Atlas of Anatomy, unfinished at his death, but published later by his associates.

For original research in anatomy he showed little taste. Two papers on the development of the paraphysis appeared in the American Journal of Anatomy, and show careful and painstaking work. But his first publication, "A Sketch of the Life of John Warren, M.D., the First Professor of Anatomy in the Medical School," printed by the Harvard Medical Alumni Association, showed his interest in historical subjects, and this soon led to studies of the early history of the school, and later to the broader subject of the history of anatomy in general. In his later years he became an enthusiastic collector of old anatomical works. His considerable collection of old books on anatomy, together with the entire medical library of the Warren family, handed down from father to son, he left at his death to the Library of the Harvard Medical School, where it is now impressively displayed as a valuable and interesting memorial to five generations.

John Warren's administrative ability was soon recognized. In 1903 he became the youngest member of the Faculty of the Medical School, and was always called upon to serve on numerous faculty committees. In 1911, President Lowell appointed him University Marshal. During the World War he was called to administrative duties, serving as Adjutant in several of the medical camps in this country, with the rank of Major.

His great height made him a conspicuous figure and induced a certain amount of shyness and reserve; and though he was always ready for a congenial companion, whether a smoking-room acquaintance for an hour or an old friend for a month, he seemed always self-sufficient, to contain within himself the means for his own enjoyment, which he was ready to share or not as occasion offered. With his family and his few personal friends the sweetness of his nature showed to best advantage, but his worth was appreciated by a great number of his students and colleagues, who recognized in him a true and scholarly gentleman and a masterly teacher.

JOHN L. BREMER.

American Academy of Arts and Sciences.

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(Corrected to November 8, 1933.)

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Tenney Lombard Davis	Norwell
Henry Fay	Brookline
Louis Frederick Fieser	Waltham
George Shannon Forbes	Cambridge
Edward Curtis Franklin	Palo Alto, Cal.
Louis John Gillespie	Cambridge
Lawrence Joseph Henderson	Cambridge
Charles Loring Jackson	Boston

Walter Louis Jennings	Worcester
Grinnell Jones	Cambridge
Frederick George Keyes	Cambridge
George Bogdan Kistiakowsky	Cambridge
Elmer Peter Kohler	Cambridge
Charles August Kraus	Providence, R. I.
Arthur Becket Lamb	Cambridge
Irving Langmuir	Schenectady, N. Y.
Gilbert Newton Lewis	Berkeley, Cal.
Warren Kendall Lewis	Newton
Arthur Dehon Little	Brookline
Duncan Arthur MacInnes	New York, N. Y.
Kenneth Lamartine Mark	Boston
Lafayette Benedict Mendel	New Haven, Conn.
Edward Mueller	Cambridge
Samuel Parsbns Mulliken	Newburyport
Charles Edward Munroe	Forest Glen, Md.
Lyman Churchill Newell	Brookline
James Flack Norris	Boston
Arthur Amos Noyes	Pasadena, Cal.
William Albert Noyes	Urbana, Ill.
William Albert Noyes, Jr.	Providence, R. I.
Samuel Cate Prescott	Brookline
Robert Hallowell Richards	Jamaica Plain
Martin André Rosanoff	Valencia, Pa.
Allan Winter Rowe	Boston
George Scatchard	Cambridge
Walter Cecil Schumb	East Milton
Miles Standish Sherrill	Winchester
Harry Monmouth Smith	Brookline
Julius Oscar Stieglitz	Chicago, Ill.
Richard Chace Tolman	Pasadena, Cal.
Henry Weeden Underwood, Jr.	Cambridge
William Hultz Walker	Pasadena, Cal.
Willis Rodney Whitney	Schenectady, N. Y.
Robert Seaton Williams	Cambridge
Alpheus Grant Woodman	Watertown

CLASS I., SECTION IV.—*Technology and Engineering.*—42.

Comfort Avery Adams	Belmont
Harold Kilbrith Barrows	Winchester
Charles Harold Berry	Belmont
William Hubert Burr	New Canaan, Conn.
Vannevar Bush	Belmont
Harry Ellsworth Clifford	Newton
Theodore Harwood Dillon	Cambridge
Philip Drinker	Brookline
Gano Dunn	New York, N. Y.
William Frederick Durand	Palo Alto, Cal.
Gordon Maskew Fair	Cambridge
Frederic Harold Fay	Boston
Glennon Gilboy	Cambridge
Albert Haertlein	Watertown
John Hays Hammond	New York, N. Y.
George Leonard Hosmer	Woburn
William Hovgaard	Brookline
James Robertson Jack	Watertown
Dugald Caleb Jackson	Cambridge
Frank Baldwin Jewett	New York, N. Y.
Lewis Jerome Johnson	Cambridge
Arthur Edwin Kennelly	Cambridge
Ralph Restieaux Lawrence	Brookline
William Henry Lawrence	Jamaica Plain
Charles Thomas Main	Winchester
Lionel Simeon Marks	Cambridge
Arthur Edwin Norton	Cambridge
Frederick Law Olmsted	Brookline
Charles Francis Park	Taunton
Langdon Pearse	Chicago, Ill.
Harold Pender	Philadelphia, Pa.
Greenleaf Whittier Pickard	Newton Center
George Edmond Russell	Arlington
Albert Sauveur	Cambridge
Henry Lloyd Smyth	Watertown
Charles Milton Spofford	Brookline

John F. Stevens	Baltimore, Md.
Edward Pearson Warner	New York, N. Y.
Arthur Edward Wells	New York, N. Y.
Robert Spurr Weston	Brookline
Frank Edward Winsor	West Newton
Joseph Ruggles Worcester	Waltham

CLASS II.—*Natural and Physiological Sciences.*—206.SECTION I.—*Geology, Mineralogy, and Physics of the Globe.*—51.

Wallace Walter Atwood	Worcester
Norman Levi Bowen	Washington, D. C.
Isaiah Bowman	New York, N. Y.
Charles Franklin Brooks	Milton
Kirk Bryan	Cambridge
Frank Morton Carpenter	Cambridge
Henry Helm Clayton	Canton
Herdman Fitzgerald Cleland	Williamstown
Reginald Aldworth Daly	Cambridge
Edward Salisbury Dana	New Haven, Conn.
William Morris Davis	Palo Alto, Cal.
William Ebenezer Ford	New Haven, Conn.
James Walter Goldthwait	Hanover, N. H.
Louis Caryl Graton	Cambridge
Herbert Ernest Gregory	Honolulu, T. H.
William Jackson Humphreys	Washington, D. C.
Ellsworth Huntington	New Haven, Conn.
Robert Tracy Jackson	Peterborough, N. H.
Thomas Augustus Jaggar	Honolulu, T. H.
Douglas Wilson Johnson	New York, N. Y.
Arthur Keith	Washington, D. C.
Alfred Church Lane	Cambridge
Esper Signius Larsen, Jr.	Cambridge
Andrew Cowper Lawson	Berkeley, Cal.
Charles Kenneth Leith	Madison, Wis.
Waldemar Lindgren	Brookline
Frederic Brewster Loomis	Amherst

Alexander George McAdie	Hampton, Va.
George Francis McEwen	La Jolla, Cal.
Donald Hamilton McLaughlin	Cambridge
Kirtley Fletcher Mather	Cambridge
Edward Bennett Mathews	Baltimore, Md.
John Campbell Merriam	Washington, D. C.
William John Miller	Los Angeles, Cal.
Frederick Kuhne Morris	Cambridge
Charles Palache	Cambridge
Percy Edward Raymond	Lexington
Austin Flint Rogers	Palo Alto, Cal.
Robert Wilcox Sayles	Chestnut Hill
Waldemar Theodore Schaller	Washington, D. C.
Charles Schuchert	New Haven, Conn.
William Berryman Scott	Princeton, N. J.
Hervey Woodburn Shimer	Hingham
Frank Bursley Taylor	Fort Wayne, Ind.
Thomas Wayland Vaughan	La Jolla, Cal.
Charles Hyde Warren	New Haven, Conn.
David White	Washington, D. C.
Herbert Percy Whitlock	New York, N. Y.
Bailey Willis	Palo Alto, Cal.
John Eliot Wolff	Pasadena, Cal.
Frederick Eugene Wright	Washington, D. C.

CLASS II., SECTION II.—*Botany*.—35.

LeRoy Abrams	Stanford University, Cal.
Oakes Ames	North Easton
Joseph Charles Arthur	Lafayette, Ind.
Irving Widmer Bailey	Cambridge
Liberty Hyde Bailey	Ithaca, N. Y.
Edward Wilber Berry	Baltimore, Md.
Nathaniel Lord Britton	New York, N. Y.
Douglas Houghton Campbell	Palo Alto, Cal.
George Perkins Clinton	New Haven, Conn.
Bradley Moore Davis	Ann Arbor, Mich.
Edward Murray East	Jamaica Plain

Rollins Adams Emerson	Ithaca, N. Y.
Alexander William Evans	New Haven, Conn.
Joseph Horace Faull	Cambridge
Merritt Lyndon Fernald	Cambridge
Richard Thornton Fisher	Petersham
Robert Almer Harper	New York, N. Y.
Albert Spear Hitchcock	Washington, D. C.
John George Jack	East Walpole
Willis Linn Jepson	Berkeley, Cal.
Ivan Murray Johnston	Jamaica Plain
Jacob Goodale Lipman	New Brunswick, N. J.
Burton Edward Livingston	Baltimore, Md.
Elmer Drew Merrill	Berkeley, Cal.
Winthrop John Vanleuven Osterhout	New York, N. Y.
George James Peirce	Palo Alto, Cal.
Alfred Rehder	Jamaica Plain
Benjamin Lincoln Robinson	Cambridge
Karl Sax	Jamaica Plain
William Albert Setchell	Berkeley, Cal.
Elvin Charles Stakman	St. Paul, Minn.
William Trelease	Urbana, Ill.
Charles Alfred Weatherby	Cambridge
William Henry Weston, Jr.	Cambridge
Ralph Hartley Wetmore	Belmont

CLASS II., SECTION III.—*Zoology and Physiology*.—66.

Nathan Banks	Cambridge
Thomas Barbour	Boston
Philip Bard	Baltimore, Md.
Francis Gano Benedict	Boston
Henry Bryant Bigelow	Concord
Robert Payne Bigelow	Brookline
William T. Bovie	Chicago, Ill.
Edward Allen Boyden	Minneapolis, Minn.
John Lewis Bremer	Boston
Charles Thomas Brues	Jamaica Plain
John Wymond Miller Bunker	Belmont

Walter Bradford Cannon	Cambridge
Thorne Martin Carpenter	Boston
William Ernest Castle	Belmont
Charles Value Chapin	Providence, R. I.
Lemuel Roscoe Cleveland	Jamaica Plain
Edwin Joseph Cohn	Cambridge
Edwin Grant Conklin	Princeton, N. J.
Manton Copeland	Brunswick, Me.
William John Crozier	Cambridge
Joseph Augustine Cushman	Sharon
Charles Benedict Davenport	Cold Spring Harbor, N. Y.
Hallowell Davis	Belmont
Alden Benjamin Dawson	Cambridge
Samuel Randall Detwiler	New York, N. Y.
Gilman Arthur Drew	Eagle Lake, Fla.
Herbert McLean Evans	Berkeley, Cal.
Henry Clinton Fall	Tyngsboro
Alexander Forbes	Milton
William King Gregory	New York, N. Y.
Joseph Grinnell	Berkeley, Cal.
Samuel Henshaw	Cambridge
Leigh Hoadley	Cambridge
Samuel Jackson Holmes	Berkeley, Cal.
Roy Graham Hoskins	Newton Center
Leland Ossian Howard	Washington, D. C.
Herbert Spencer Jennings	Baltimore, Md.
Charles Atwood Kofoid	Berkeley, Cal.
Frederic Thomas Lewis	Waban
Frank Rattray Lillie	Chicago, Ill.
Ralph Stayner Lillie	Chicago, Ill.
Richard Swann Lull	New Haven, Conn.
Edward Laurens Mark	Cambridge
Ernest Gale Martin	Palo Alto, Cal.
Albert Davis Mead	Providence, R. I.
Axel Leonard Melander	New York, N. Y.
Gerrit Smith Miller	Washington, D. C.
Thomas Hunt Morgan	Pasadena, Cal.

Herbert Vincent Neal	Tufts College
Henry Fairfield Osborn	New York, N. Y.
George Howard Parker	Cambridge
Raymond Pearl	Baltimore, Md.
John Charles Phillips	Wenham
Henry Augustus Pilsbry	Philadelphia, Pa.
Frederick Haven Pratt	Wellesley Hills
Herbert Wilbur Rand	Cambridge
David Rapport	Cambridge
Alfred Clarence Redfield	Milton
William Emerson Ritter	Berkeley, Cal.
Alexander Grant Ruthven	Ann Arbor, Mich.
Percy Goldthwait Stiles	Newtonville
Arthur Wisswald Weyssse	Boston
William Morton Wheeler	Boston
Edmund Beecher Wilson	New York, N. Y.
Frederick Adams Woods	Rome, Italy
Jeffries Wyman, Jr.	Chestnut Hill

CLASS II., SECTION IV.—*Medicine and Surgery*.—54.

Joseph Charles Aub	Belmont
James Bourne Ayer	Milton
Franklin Greene Balch	Boston
George Blumer	New Haven, Conn.
Charles Macfie Campbell	Cambridge
Alexis Carrel	New York, N. Y.
William Bosworth Castle	Boston
David Cheever	Boston
Henry Asbury Christian	Boston
Stanley Cobb	Milton
Rufus Cole	New York, N. Y.
Harvey Cushing	New Haven, Conn.
Elliott Carr Cutler	Brookline
Eugene Floyd DuBois	New York, N. Y.
Reginald Fitz	Brookline
Simon Flexner	New York, N. Y.
James Lawder Gamble	Brookline

Joseph Lincoln Goodale	Boston
Robert Battey Greenough	Boston
Ross Granville Harrison	New Haven, Conn.
Percy Rogers Howe	Belmont
William Henry Howell	Baltimore, Md.
Edgar Erskine Hume	Washington, D. C.
Reid Hunt	Boston
Elliott Proctor Joslin	Boston
Roger Irving Lee	Brookline
Edwin Allen Locke	Boston
Warfield Theobald Longcope	Baltimore, Md.
Fred Bates Lund	Newton
George Burgess Magrath	Boston
Frank Burr Mallory	Brookline
William James Mayo	Rochester, Minn.
George Richards Minot	Brookline
William Lorenzo Moss	Augusta, Ga.
John Howard Mueller	Boston
Robert Bayley Osgood	Boston
Joseph Hershey Pratt	Boston
Milton Joseph Rosenau	Brookline
Andrew Watson Sellards	Boston
George Cheever Shattuck	Brookline
Theobald Smith	Princeton, N. J.
Torald Hermann Sollmann	Cleveland, Ohio
Charles Wardell Stiles	Washington, D. C.
Richard Pearson Strong	Boston
Fritz Bradley Talbot	Brookline
Ernest Edward Tyzzer	Wakefield
Frederick Herman Verhoeff	Boston
Joseph Treloar Wearn	Cleveland, Ohio
Soma Weiss	Cambridge
William Henry Welch	Baltimore, Md.
Benjamin White	Boston
Francis Henry Williams	Boston
Simeon Burt Wolbach	Sudbury
Hans Zinsser	Boston

CLASS III.—*The Social Arts.*—123.SECTION I.—*Jurisprudence.*—36.

George Weston Anderson	Boston
Francis Noyes Balch	Jamaica Plain
Joseph Henry Beale	Cambridge
Harry Augustus Bigelow	Chicago, Ill.
Henry Wolf Biklé	Philadelphia, Pa.
Benjamin Nathan Cardozo	Washington, D. C.
John Dickinson	Philadelphia, Pa.
Fred Tarbell Field	Newton
Felix Frankfurter	Cambridge
Thomas Hovey Gage	Worcester
Theodore Francis Green	Providence, R. I.
Walter Perley Hall	Fitchburg
Learned Hand	New York, N. Y.
Charles Evans Hughes	Washington, D. C.
Nathan Isaacs	Cambridge
Eldon Revare James	Cambridge
Frederick Lawton	Boston
James Arnold Lowell	Newton
Sayre Macneil	Azusa, Cal.
Calvert Magruder	Cambridge
William DeWitt Mitchell	Washington, D. C.
Edmund Morris Morgan	Arlington
Herbert Parker	South Lancaster
George Wharton Pepper	Philadelphia, Pa.
Roscoe Pound	Watertown
Odin Roberts	Boston
Elihu Root	New York, N. Y.
Arthur Prentice Rugg	Worcester
Francis Bowes Sayre	Washington, D. C.
Austin Wakeman Scott	Cambridge
Harlan Fiske Stone	Washington, D. C.
Edward Sampson Thurston	Cambridge
William Cushing Wait	Medford
Eugene Wambaugh	Cambridge

Edmund Allen Whitman	Cambridge
George Woodward Wickersham	New York, N. Y.

CLASS III., SECTION II.—*Government, International Law, and Diplomacy*.—24.

George Hubbard Blakeslee	Worcester
Edwin Montefiore Borchard	New Haven, Conn.
William Richards Castle, Jr.	Washington, D. C.
Joseph Perkins Chamberlain	New York, N. Y.
Robert Treat Crane	New York, N. Y.
William Yandell Elliott	Belmont
Sidney Bradshaw Fay	Cambridge
William Cameron Forbes	Norwood
Joseph Clark Grew	Tokyo, Japan
Albert Bushnell Hart	Cambridge
Arthur Norman Holcombe	Cambridge
Manley Ottmer Hudson	Cambridge
Philip Carryl Jessup	New York, N. Y.
Abbott Lawrence Lowell	Boston
William MacDonald	New York, N. Y.
Charles Edward Merriam	Chicago, Ill.
Ogden Livingston Mills	New York, N. Y.
John Bassett Moore	New York, N. Y.
William Bennett Munro	Pasadena, Cal.
Westel Woodbury Willoughby	Baltimore, Md.
William Franklin Willoughby	Washington, D. C.
George Grafton Wilson	Cambridge
Quincy Wright	Chicago, Ill.
Henry Aaron Yeomans	Cambridge

CLASS III., SECTION III.—*Economics and Sociology*.—38.

Charles Jesse Bullock	Cambridge
Harold Hitchings Burbank	Cambridge
Richard Clarke Cabot	Cambridge
Thomas Nixon Carver	Cambridge
John Bates Clark	New York, N. Y.
John Candler Cobb	Milton
Arthur Harrison Cole	Cambridge

Melvin Thomas Copeland	Cambridge
William Leonard Crum	Cambridge
William James Cunningham	Cambridge
Clive Day	New Haven, Conn.
Davis Rich Dewey	Cambridge
Arthur Stone Dewing	Cambridge
Wallace Brett Donham	Boston
Irving Fisher	New Haven, Conn.
James Ford	Cambridge
Edwin Francis Gay	Cambridge
Sheldon Glueck	Cambridge
Henry Wyman Holmes	Cambridge
Walter Wallace McLaren	Williamstown
Leon Carroll Marshall	Baltimore, Md.
Edward Sagendorph Mason	Cambridge
Frederick Cecil Mills	New York, N. Y.
Wesley Clair Mitchell	New York, N. Y.
Harold Glenn Moulton	Washington, D. C.
William Fielding Ogburn	Chicago, Ill.
Warren Milton Persons	New York, N. Y.
George Byron Roorbach	Cambridge
Leo S. Rowe	Washington, D. C.
Josef Alois Schumpeter	Cambridge
Carl Snyder	New York, N. Y.
Pitirim Alexandrovich Sorokin	Winchester
Oliver Mitchell Wentworth Sprague	Cambridge
Frank William Taussig	Cambridge
William Isaac Thomas	New York, N. Y.
Donald Skeele Tucker	Cambridge
Abbott Payson Usher	Belmont
John Henry Williams	Cambridge

CLASS III., SECTION IV.—*Administration and Affairs.*—25.

Charles Francis Adams	Concord
Charles Foster Batchelder	Cambridge
George Hoyt Bigelow	Milton
Ingersoll Bowditch	Jamaica Plain

John Albert Cousens	Tufts College
Henry Sturgis Dennison	Framingham
William Lusk Webster Field	Milton
Frank Johnson Goodnow	Baltimore, Md.
Francis Russell Hart	Boston
Edward Jackson Holmes	Boston
Nathaniel Thayer Kidder	Milton
Thomas William Lamont	New York, N. Y.
James Vance May	Boston
Everett Morss	Boston
Robert Lincoln O'Brien	Dedham
Thomas Nelson Perkins	Westwood
Andrew James Peters	Jamaica Plain
Herbert Putnam	Washington, D. C.
Alfred Lawrence Ripley	Andover
Jeremiah Smith, Jr.	Cambridge
Payson Smith	Brookline
Albert Warren Stearns	Billerica
Charles Henry Taylor	Boston
Edwin Sibley Webster	Brookline
Benjamin Loring Young	Weston

CLASS IV.—*The Humanities*.—195.SECTION I.—*Theology, Philosophy, and Psychology*.—45.

Michael Joseph Ahern	Weston
Gordon Willard Allport	Cambridge
James Rowland Angell	New Haven, Conn.
John Gilbert Beebe-Center	Swampscott
Edwin Garrigues Boring	Cambridge
Edgar Sheffield Brightman	Newton
Henry Addington Bruce	Cambridge
Leonard Carmichael	Providence, R. I.
J(ames) McKeen Cattell	Garrison, N. Y.
George Croft Cell	Reading
Walter Fenno Dearborn	Cambridge
Edmund Burke Delabarre	Providence, R. I.
Raymond Dodge	New Haven, Conn.

Curt John Ducasse	Providence, R. I.
William Henry Paine Hatch	Cambridge
William Healy	Boston
William Arthur Heidel	Middletown, Conn.
William Ernest Hocking	Cambridge
Walter Samuel Hunter	Worcester
Frederick John Foakes Jackson	Englewood, N. J.
Truman Lee Kelley	Cambridge
Albert Cornelius Knudson	Cambridge
Karl Spencer Lashley	Chicago, Ill.
William Lawrence	Boston
Clarence Irving Lewis	Cambridge
Lee Sullivan McCollester	Tufts College
William McDougall	Durham, N. C.
Edward Caldwell Moore	Cambridge
Paul Elmer More	Princeton, N. J.
Arthur Darby Nock	Cambridge
William Cardinal O'Connell	Boston
Johnson O'Connor	Boston
Charles Edwards Park	Boston
Leighton Parks	London, England
Francis Greenwood Peabody	Cambridge
Carroll Cornelius Pratt	Cambridge
James Hugh Ryan	Washington, D. C.
Henry Knox Sherrill	Boston
Willard Learoyd Sperry	Cambridge
Russell Henry Stafford	Brookline
Henry Bradford Washburn	Cambridge
John Broadus Watson	New York, N. Y.
Frederic Lyman Wells	Newton Highlands
James Haughton Woods	Cambridge
Robert Mearns Yerkes	New Haven, Conn.

CLASS IV., SECTION II.—*History, Archaeology, and Anthropology.*—40.

Charles McLean Andrews	New Haven, Conn.
James Phinney Baxter, 3d	Cambridge
Carl Lotus Becker	Ithaca, N. Y.

Robert Pierpont Blake	Cambridge
Franz Boas	New York, N. Y.
William Brooks Cabot	Boston
George Henry Chase	Cambridge
Roland Burrage Dixon	Cambridge
Wilberforce Eames	New York, N. Y.
Ephraim Emerton	Cambridge
Max Farrand	San Marino, Cal.
William Scott Ferguson	Cambridge
Worthington Chauncey Ford	Cambridge
Henry Thatcher Fowler	Providence, R. I.
Evarts Boutell Greene	New York, N. Y.
Charles Homer Haskins	Cambridge
Charles Downer Hazen	New York, N. Y.
Bert Hodge Hill	Athens, Greece
Earnest Albert Hooton	Cambridge
Halford Lancaster Hoskins	Tufts College
Aleš Hrdlička	Washington, D. C.
Alfred Vincent Kidder	Washington, D. C.
Alfred Louis Kroeber	Berkeley, Cal.
Kirsopp Lake	Cambridge
George LaPiana	Cambridge
Waldo Gifford Leland	Washington, D. C.
Charles Howard McIlwain	Cambridge
Roger Bigelow Merriman	Cambridge
Samuel Eliot Morison	Boston
George Andrew Reisner	Boston
Michael Ivanovich Rostovtzeff	New Haven, Conn.
Edward Sapir	New Haven, Conn.
George Sarton	Cambridge
Arthur Meier Schlesinger	Cambridge
Herbert Joseph Spinden	Brooklyn, N. Y.
John Osborne Sumner	Boston
Charles Holt Taylor	Cambridge
Charles Cutler Torrey	New Haven, Conn.
Alfred Marston Tozzer	Cambridge
Clark Wissler	New York, N. Y.

CLASS IV., SECTION III.—*Philology*.—53.

Edward Cooke Armstrong	Princeton, N. J.
William Nickerson Bates	Philadelphia, Pa.
Campbell Bonner	Ann Arbor, Mich.
Carleton Brown	New York, N. Y.
Carl Darling Buck	Chicago, Ill.
Edward Capps	Princeton, N. J.
Walter Eugene Clark	Cambridge
Ronald Salmon Crane	Chicago, Ill.
Morris William Croll	Princeton, N. J.
Samuel Hazzard Cross	Cambridge
Franklin Edgerton	New Haven, Conn.
Frank Edgar Farley	Middletown, Conn.
Jeremiah Denis Mathias Ford	Cambridge
James Geddes, Jr.	Brookline
Charles Hall Grandgent	Cambridge
Louis Herbert Gray	New York, N. Y.
William Chase Greene	Cambridge
Charles Burton Gulick	Cambridge
Roy Kenneth Hack	Cincinnati, Ohio
Raymond Dexter Havens	Baltimore, Md.
George Lincoln Hendrickson	New Haven, Conn.
William Guild Howard	Cambridge
Eugene Xavier Louis Henry Hyvernati	Washington, D. C.
Carl Newell Jackson	Cambridge
James Richard Jewett	Cambridge
(Ralph) Hayward Keniston	Chicago, Ill.
George Lyman Kittredge	Cambridge
Hans Kurath	Providence, R. I.
Henry Roseman Lang	New Haven, Conn.
Ernest Felix Langley	Cambridge
Charles Rockwell Lanman	Cambridge
Ivan Mortimer Linforth	Berkeley, Cal.
David Gordon Lyon	Cambridge
Francis Peabody Magoun, Jr.	Cambridge
Albert Matthews	Boston
William Albert Nitze	Chicago, Ill.

George Rapall Noyes	Berkeley, Cal.
Milman Parry	Belmont
Howard Rollin Patch	Northampton
Arthur Stanley Pease	Cambridge
Edward Kennard Rand	Cambridge
Fred Norris Robinson	Cambridge
Robert Kilburn Root	Princeton, N. J.
Rudolph Schevill	Berkeley, Cal.
Horatio Elwin Smith	Providence, R. I.
Herbert Weir Smyth	Cambridge
Franklin Bache Stephenson	Washington, D. C.
William Thomson	Cambridge
George Benson Weston	Cambridge
Joshua Whatmough	Cambridge
Ernest Hatch Wilkins	Oberlin, Ohio
Harry Austryn Wolfson	Cambridge
Karl Young	New Haven, Conn.

CLASS IV., SECTION IV.—*The Fine Arts and Belles Lettres*.—57.

George Pierce Baker	New Haven, Conn.
Stephen Vincent Benét	New York, N. Y.
Frank Weston Benson	Salem
(William) Welles Bosworth	New York, N. Y.
LeBaron Russell Briggs	Cambridge
John Alden Carpenter	Chicago, Ill.
Chalmers Dancy Clifton	New York, N. Y.
Charles Collens	Newton Center
Kenneth John Conant	Cambridge
Frederick Shepherd Converse	Westwood
Charles Allerton Coolidge	Boston
Charles Townsend Copeland	Cambridge
Ralph Adams Cram	Boston
Cyrus Edwin Dallin	Arlington Heights
George Harold Edgell	Cambridge
William Emerson	Cambridge
Carl Engel	Washington, D. C.
John Erskine	New York, N. Y.
Arthur Fairbanks	Hanover, N. H.

Edward Waldo Forbes	Cambridge
Robert Frost	South Shaftsbury, Vt.
Wallace Goodrich.	Boston
Robert Grant	Boston
Chester Noyes Greenough	Cambridge
Edward Burlingame Hill.	Cambridge
Robert Silliman Hillyer	Cambridge
Charles Hopkinson	Manchester
Mark Antony DeWolfe Howe	Boston
Archer Milton Huntington	New York, N. Y.
Henry James	New York, N. Y.
William James.	Cambridge
Leo Rich Lewis	Tufts College
John Ellerton Lodge	Washington, D. C.
Charles Martin Tornov Loeffler.	Medfield
John Livingston Lowes	Cambridge
Charles Donagh Maginnis	Brookline
Paul Manship	New York, N. Y.
Daniel Gregory Mason	New York, N. Y.
Frank Jewett Mather	Princeton, N. J.
Harold Murdock	Chestnut Hill
Kenneth Ballard Murdock	Cambridge
William Allan Neilson	Northampton
Curtis Hidden Page	Gilmanton, N. H.
William Lyon Phelps.	New Haven, Conn.
Anthony John Philpott	Arlington
Chandler Rathfon Post	Cambridge
Edwin Arlington Robinson	New York, N. Y.
Denman Waldo Ross.	Cambridge
Paul Joseph Sachs	Cambridge
Ellery Sedgwick	Boston
Henry Dwight Sedgwick.	Dedham
Henry Richardson Shepley	Brookline
David Stanley Smith.	New Haven, Conn.
Edmund C. Tarbell	Boston
Charles Howard Walker	Boston
Owen Wister	Philadelphia, Pa.
Charles Henry Conrad Wright	Cambridge

FOREIGN HONORARY MEMBERS.—119.

(Number limited to one hundred and thirty.)

CLASS I.—*Mathematical and Physical Sciences*.—33.SECTION I.—*Mathematics and Astronomy*.—9.

Arthur Stanley Eddington	Cambridge, England
Jacques Salomon Hadamard	Paris
Godfrey Harold Hardy	Cambridge, England
Ejnar Hertzsprung	Leyden
Tullio Levi-Civita	Rome
Charles Emile Picard	Paris
Willem de Sitter	Leyden
Charles Jean de la Vallée Poussin	Louvain
Hermann Weyl	Princeton, N. J.

CLASS I., SECTION II.—*Physics*.—9.

Vilhelm Frimann Koren Bjerknes	Oslo
Albert Einstein	Princeton, N. J.
James Franck	Baltimore, Md.
Abram F. Joffé	Leningrad
Sir Joseph Larmor	Cambridge, England
Friedrich Paschen	Charlottenburg
Max Planck	Berlin
Sir Ernest Rutherford	Cambridge, England
Sir Joseph John Thomson	Cambridge, England

CLASS I., SECTION III.—*Chemistry*.—9.

Johannes N. Brønsted	Copenhagen
Peter Debye	Zürich
Fritz Haber	Berlin
Jaroslav Heyrovsky	Prague
Henri Louis Le Chatelier	Paris
Archibald Byron Macallum	London, Ontario
Fritz Paneth	Killeen, Tayinloan, Scotland
Sören Peter Lauritz Sörensen	Copenhagen
Heinrich Wieland	Munich

CLASS I., SECTION IV.—*Technology and Engineering*.—6.

Maurice d'Ocagne.	Paris
Ludwig Prandtl	Göttingen
Emil Probst	Karlsruhe
Aurel Stodola	Zürich
Vsevolod Evgenievich Timonoff.	Leningrad
Karl Willy Wagner	Berlin

CLASS II.—*Natural and Physiological Sciences*.—31.SECTION I.—*Geology, Mineralogy, and Physics of the Globe*.—8.

Frank Dawson Adams	Montreal
Charles Barrois	Lille
Waldemar Christofer Brögger	Oslo
Léon William Collet	Geneva
Albert Heim	Zürich
Emmanuel de Margerie	Paris
Gustaf Adolf Frederik Molengraaff.	Delft
Sir William Napier Shaw	London

CLASS II., SECTION II.—*Botany*.—7.

Frederick Orpen Bower	Ripon
Ludwig Diels	Berlin
Kingo Miyabe.	Sapporo, Japan
Alfred Barton Rendle	London
Otto Renner	Jena
Albert Charles Seward	Cambridge, England
Hugo de Vries.	Luntern

CLASS II., SECTION III.—*Zoology and Physiology*.—9.

Francis Arthur Bather	London
George Albert Boulenger.	Brussels
Maurice Caullery	Paris
August Krogh	Copenhagen
Louis Édouard Lapicque.	Paris
George Henry Falkiner Nuttall.	Cambridge, England

Charles Tate Regan	London
Hans Spemann	Freiburg i. Br.
D'Arcy Wentworth Thompson	St. Andrews

CLASS II., SECTION IV.—*Medicine and Surgery*.—7.

Sir Thomas Barlow, Bart.	London
Henry Hallett Dale	London
Sir Arthur Keith	London
Mikinosuke Miyajima	Tokyo
Friedrich von Müller	Munich
Sir Charles Scott Sherrington	Oxford
Sir Arnold Theiler	London

CLASS III.—*The Social Arts*.—21.SECTION I.—*Jurisprudence*.—9.

Frantz Dahl	Copenhagen
Léon Duguit	Bordeaux
François Geny	Nancy
Hans Kelsen	Vienna
Juljusz Makarewicz	Lwów
Rt. Hon. Sir Frederick Pollock, Bart.	London
Joseph Redlich	Cambridge, Mass.
Rudolph Stammler	Wernigerode a. H.
Giorgio Del Vecchio	Rome

SECTION II.—*Government, International Law, and Diplomacy*.—3.

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 Müller, F. von. FHM, II: 4
 Müller, G. E. FHM, IV: 1
 Mueller, J. H. F, II: 4
 Mulliken, S. P. F, I: 3
 Munro, W. B. F, III: 2
 Munroe, C. E. F, I: 3
 Murdock, H. F, IV: 4
 Murdock, K. B. F, IV: 4
 Murray, G. FHM, IV: 4
 Neal, H. V. F, II: 3
 Neilson, W. A. F, IV: 4
 Newell, L. C. F, I: 3
 Nichols, E. L. F, I: 2
 Nitze, W. A. F, IV: 3
 Nock, A. D. F, IV: 1
 Norris, J. F. F, I: 3
 Norton, A. E. F, I: 4
 Norton, C. L. F, I: 2
 Noyes, A. A. F, I: 3
 Noyes, G. R. F, IV: 3
 Noyes, W. A. F, I: 3
 Noyes, W. A., Jr. F, I: 3
 Nuttall, G. H. F. FHM, II: 3
 O'Brien, R. L. F, III: 4
 d'Ocagne, M. FHM, I: 4
 O'Connell, W. H. F, IV: 1
 O'Connor, J. F, IV: 1
 Oertel, H. FHM, IV: 3
 Ogburn, W. F. F, III: 3
 Oldenberg, O. F, I: 2
 Olmsted, F. L. F, I: 4
 Osborn, H. F. F, II: 3
 Osgood, R. B. F, II: 4
 Osterhout, W. J. V. F, II: 2
 Page, C. H. F, IV: 4
 Palache, C. F, II: 1
 Paneth, F. FHM, I: 3
 Park, C. E. F, IV: 1
 Park, C. F. F, I: 4
 Parker, G. H. F, II: 3
 Parker, H. F, III: 1
 Parks, L. F, IV: 1
 Parry, M. F, IV: 3
 Paschen, F. FHM, I: 2
 Patch, H. R. F, IV: 3
 Peabody, F. G. F, IV: 1
 Pearl, R. F, II: 3
 Pearce, L. F, I: 4
 Pearson, K. FHM, IV: 2
 Pease, A. S. F, IV: 3
 Peers, E. A. FHM, IV: 4
 Peirce, G. J. F, II: 2
 Pender, H. F, I: 4
 Pepper, G. W. F, III: 1
 Perkins, T. N. F, III: 4
 Persons, W. M. F, III: 3
 Peters, A. J. F, III: 4
 Phelps, W. L. F, IV: 4
 Phillips, H. B. F, I: 1
 Phillips, J. C. F, II: 3
 Philpott, A. J. F, IV: 4
 Picard, C. E. FHM, I: 1
 Pickard, G. W. F, I: 4

- Pickering, W. H. F, I: 1
 Pidal, R. M. FHM, IV: 3
 Pierce, G. W. F, I: 2
 Pigou, A. C. FHM, III: 3
 Pilsbry, H. A. F, II: 3
 Pirene, H. FHM, IV: 2
 Planck, M. FHM, I: 2
 Poincaré, R. FHM, III: 4
 Pollock, Sir F. FHM, III: 1
 Poor, C. L. F, I: 1
 Post, C. R. F, IV: 4
 Pound, R. F, III: 1
 Prandtl, L. FHM, I: 4
 Pratt, C. C. F, IV: 1
 Pratt, F. H. F, II: 3
 Pratt, J. H. F, II: 4
 Prescott, S. C. F, I: 3
 Probst, E. FHM, I: 4
 Pupin, M. I. F, I: 2
 Putnam, H. F, III: 4
 Rabaud, H. FHM, IV: 4
 Rand, E. K. F, IV: 3
 Rand, H. W. F, II: 3
 Rapport, D. F, II: 3
 Raymond, P. E. F, II: 1
 Reading, Lord. FHM, III: 4
 Redfield, A. C. F, II: 3
 Redlich, J. FHM, III: 1
 Regan, C. T. FHM, II: 3
 Rehder, A. F, II: 2
 Reisner, G. A. F, IV: 2
 Rendle, A. B. FHM, II: 2
 Renner, O. FHM, II: 2
 Richards, R. H. F, I: 3
 Richardson, R. G. D. F, I: 1
 Ripley, A. L. F, III: 4
 Rist, C. FHM, III: 3
 Ritter, W. E. F, II: 3
 Roberts, O. F, III: 1
 Robinson, B. L. F, II: 2
 Robinson, E. A. F, IV: 4
 Robinson, F. N. F, IV: 3
 Rogers, A. F. F, II: 1
 Roorbach, G. B. F, III: 3
 Root, E. F, III: 1
 Root, R. K. F, IV: 3
 Rosanoff, M. A. F, I: 3
 Rosenau, M. J. F, II: 4
 Ross, D. W. F, IV: 4
 Rostovtzeff, M. I. F, IV: 2
 Rowe, A. W. F, I: 3
 Rowe, L. S. F, III: 3
 Rugg, A. P. F, III: 1
 Russell, G. E. F, I: 4
 Russell, H. N. F, I: 1
 Rutherford, Sir E. FHM, I: 2
 Ruthven, A. G. F, II: 3
 Rutledge, G. F, I: 1
 Ryan, J. H. F, IV: 1
 Sachs, P. J. F, IV: 4
 Sapir, E. F, IV: 2
 Sarton, G. F, IV: 2
 Saunders, F. A. F, I: 2
 Sauveur, A. F, I: 4
 Sax, K. F, II: 2
 Sayles, R. W. F, II: 1
 Sayre, F. B. F, III: 1
 Scatchard, G. F, I: 3
 Schaller, W. T. F, II: 1
 Schevill, R. F, IV: 3
 Schlesinger, A. M. F, IV: 2
 Schlesinger, F. F, I: 1
 Schuchert, C. F, II: 1
 Schumb, W. C. F, I: 3
 Schumpeter, J. A. F, III: 3
 Scott, A. W. F, III: 1
 Scott, W. B. F, II: 1
 Sedgwick, E. F, IV: 4
 Sedgwick, H. D. F, IV: 4
 Sellards, A. W. F, II: 4
 Setchell, W. A. F, II: 2
 Seward, A. C. FHM, II: 2
 Shapley, H. F, I: 1
 Shattuck, F. C. F, II: 4
 Shaw, Sir W. N. FHM, II: 1
 Shepley, H. R. F, IV: 4
 Sherrill, H. K. F, IV: 1
 Sherrill, M. S. F, I: 3
 Sherrington, Sir C. S. FHM, II: 4
 Shimer, H. W. F, II: 1

- Sitter, W. de. FHM, I: 1
Slater, J. C. F, I: 2
Slipher, V. M. F, I: 1
Slocum, F. F, I: 1
Smith, D. S. F, IV: 4
Smith, H. E. F, IV: 3
Smith, H. M. F, I: 3
Smith, J., Jr. F, III: 4
Smith, P. F, III: 4
Smith, T. F, II: 4
Smyth, H. L. F, I: 4
Smyth, H. W. F, IV: 3
Snyder, C. F, III: 3
Snyder, V. F, I: 1
Sörensen, S. P. L. FHM, I: 3
Sollmann, T. H. F, II: 4
Sombart, W. FHM, III: 3
Sorokin, P. A. F, III: 3
Spemann, H. FHM, II: 3
Sperry, W. L. F, IV: 1
Spinden, H. J. F, IV: 2
Spofford, C. M. F, I: 4
Sprague, O. M. W. F, III: 3
Stafford, R. H. F, IV: 1
Stakman, E. C. F, II: 2
Stammmler, R. FHM, III: 1
Stamp, Sir J. FHM, III: 4
Stearns, A. W. F, III: 4
Stebbins, J. F, I: 1
Stein, Sir A. FHM, IV: 2
Stephenson, F. B. F, IV: 3
Stetson, H. T. F, I: 1
Stevens, J. F. F, I: 4
Stieglitz, J. O. F, I: 3
Stiles, C. W. F, II: 4
Stiles, P. G. F, II: 3
Stodola, A. FHM, I: 4
Stone, H. F. F, III: 1
Stone, J. S. F, I: 2
Stone, M. H. F, I: 1
Strong, R. P. F, II: 4
Struik, D. J. F, I: 1
Sumner, J. O. F, IV: 2
Taber, H. F, I: 1
Talbot, F. B. F, II: 4
Tamarkin, J. D. F, I: 1
Tarbell, E. C. F, IV: 4
Taussig, F. W. F, III: 3
Taylor, C. H. F, III: 4
Taylor, C. H. F, IV: 2
Taylor, F. B. F, II: 1
Terry, C. S. FHM, IV: 2
Theiler, Sir A. FHM, II: 4
Thomas, F. W. FHM, IV: 3
Thomas, W. I. F, III: 3
Thompson, D'A. W. FHM, II: 3
Thompson, M. deK. F, I: 2
Thomson, E. F, I: 2
Thomson, Sir J. J. FHM, I: 2
Thomson, W. F, IV: 3
Thurston, E. S. F, III: 1
Timonoff, V. E. FHM, I: 4
Tolman, R. C. F, I: 3
Torrey, C. C. F, IV: 2
Tozzer, A. M. F, IV: 2
Trelease, W. F, II: 2
Trevelyan, G. M. FHM, IV: 2
Tucker, D. S. F, III: 3
Tyler, H. W. F, I: 1
Tyzzler, E. E. F, II: 4
Underwood, H. W., Jr. F, I: 3
Usher, A. P. F, III: 3
Vallarta, M. S. F, I: 2
Vallée Poussin, C. J. dela. FHM, I: 1
Vaughan, T. W. F, II: 1
Veblen, O. F, I: 1
Vecchio, G. Del. FHM, III: 1
Verhoeff, F. H. F, II: 4
Vries, H. de. FHM, II: 2
Wagner, K. W. FHM, I: 4
Wait, W. C. F, III: 1
Walker, C. H. F, IV: 4
Walker, W. H. F, I: 3
Walsh, J. L. F, I: 1
Wambaugh, E. F, III: 1
Warner, E. P. F, I: 4
Warren, C. H. F, II: 1
Washburn, H. B. F, IV: 1
Watson, J. B. F, IV: 1
Wearn, J. T. F, II: 4

- Weatherby, C. A. F, II: 2
Webster, D. L. F, I: 2
Webster, E. S. F, III: 4
Weiss, S. F, II: 4
Welch, W. H. F, II: 4
Wells, A. E. F, I: 4
Wells, F. L. F, IV: 1
Weston, G. B. F, IV: 3
Weston, R. S. F, I: 4
Weston, W. H. F, II: 2
Wetmore, R. H. F, II: 2
Weyl, H. FHM, I: 1
Weyssse, A. W. F, II: 3
Whatmough, J. F, IV: 3
Wheeler, W. M. F, II: 3
White, B. F, II: 4
White, D. F, II: 1
Whitehead, A. N. F, I: 1
Whitlock, H. P. F, II: 1
Whitman, E. A. F, III: 1
Whitney, W. R. F, I: 3
Wickersham, G. W. F, III: 1
Widder, D. V. F, I: 1
Wieland, H. FHM, I: 3
Wilkins, E. H. F, IV: 3
Williams, F. H. F, II: 4
Williams, J. H. F, III: 3
Williams, R. S. F, I: 3
Willis, B. F, II: 1
Willoughby, W. F. F, III: 2
Willoughby, W. W. F, III: 2
Wilson, E. B. F, II: 3
Wilson, E. B. F, I: 2
Wilson, G. G. F, III: 2
Winsor, F. E. F, I: 4
Wissler, C. F, IV: 2
Wister, O. F, IV: 4
Wolbach, S. B. F, II: 4
Wolff, J. E. F, II: 1
Wolfson, H. A. F, IV: 3
Wood, R. W. F, I: 2
Woodman, A. G. F, I: 3
Woods, F. A. F, II: 3
Woods, F. S. F, I: 1
Woods, J. H. F, IV: 1
Worcester, J. R. F, I: 4
Wright, C. H. C. F, IV: 4
Wright, F. E. F, II: 1
Wright, Q. F, III: 2
Wyman, J., Jr. F, II: 3
Yeomans, H. A. F, III: 2
Yerkes, R. M. F, IV: 1
Young, B. L. F, III: 4
Young, K. F, IV: 3
Zeleny, J. F, I: 2
Zinsser, H. F, II: 4

STATUTES AND STANDING VOTES.

STATUTES.

Adopted November 8, 1911: amended May 8, 1912, January 8, and May 14, 1913, April 14, 1915, April 12, 1916, April 10, 1918, May 14, 1919, February 8, April 12, and December 13, 1922, February 14, March 14, and October 10, 1923, March 10, 1926, May 9, 1928, April 8, 1931, and November 11, 1931, and April 12, 1933.

CHAPTER I.

THE CORPORATE SEAL.

ARTICLE 1. The Corporate Seal of the Academy shall be as here depicted:



ARTICLE 2. The Recording Secretary shall have the custody of the Corporate Seal.

See Chap. v, art. 3; chap. vi, art. 2.

CHAPTER II.

FELLOWS AND FOREIGN HONORARY MEMBERS AND DUES.

ARTICLE 1. The Academy consists of Fellows, who are either citizens or residents of the United States of America, and Foreign Honorary Members. They are arranged in four Classes, according to the Arts and Sciences in which they are severally proficient, and each Class is divided into four Sections, namely:

CLASS I. *The Mathematical and Physical Sciences*

- Section 1. Mathematics and Astronomy
- Section 2. Physics
- Section 3. Chemistry
- Section 4. Technology and Engineering

CLASS II. *The Natural and Physiological Sciences*

- Section 1. Geology, Mineralogy, and Physics of the Globe
- Section 2. Botany
- Section 3. Zoölogy and Physiology
- Section 4. Medicine and Surgery

CLASS III. *The Social Arts*

- Section 1. Jurisprudence
- Section 2. Government, International Law, and Diplomacy
- Section 3. Economics and Sociology
- Section 4. Administration and Affairs

CLASS IV. *The Humanities*

- Section 1. Theology, Philosophy, and Psychology
- Section 2. History, Archæology, and Anthropology
- Section 3. Philology
- Section 4. The Fine Arts and Belles Lettres

ARTICLE 2. The number of Fellows shall not exceed Eight hundred, of whom not more than Six hundred shall be residents of Massachusetts, nor shall there be more than Two hundred and ten in any one Class.

ARTICLE 3. The number of Foreign Honorary Members shall not exceed One hundred and thirty. They shall be chosen from among

citizens of foreign countries most eminent for their discoveries and attainments in any of the Classes above enumerated. There shall not be more than Thirty-five in any one Class.

ARTICLE 4. If any person, after being notified of his election as Fellow, shall neglect for six months to accept in writing, or, if a Fellow resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this Article of the Statutes in the meantime, he shall cease to be a Fellow; but the Council may suspend the provisions of this Article for a reasonable time.

With the previous consent of the Council, the Treasurer may dispense (*sub silentio*) with the payment of the Admission Fee or of the Annual Dues or both whenever he shall deem it advisable. In the case of officers of the Army or Navy who are out of the Commonwealth on duty, payment of the Annual Dues may be waived during such absence if continued during the whole financial year and if notification of such expected absence be sent to the Treasurer. Upon similar notification to the Treasurer, similar exemption may be accorded to Fellows subject to Annual Dues, who may temporarily remove their residence for at least two years to a place more than fifty miles from Boston.

If any person elected a Foreign Honorary Member shall neglect for six months after being notified of his election to accept in writing, his election shall be void.

See Chap. vii, art. 2.

ARTICLE 5. Every Fellow resident within fifty miles of Boston hereafter elected shall pay an Admission Fee of Ten dollars, unless previously as an Associate he has paid an Admission Fee of like amount.

Every Fellow resident within fifty miles of Boston shall, and others may, pay such Annual Dues, not exceeding Fifteen dollars, as shall be voted by the Academy at each Annual Meeting, when they shall become due; but any Fellow shall be exempt from the annual payment if, at any time after his admission, he shall pay into the treasury

Two hundred dollars in addition to his previous payments. Any Fellow shall also be exempt from Annual Dues who has paid such dues for forty years, or, having attained the age of seventy-five has paid dues for twenty-five years.

All Commutations of the Annual Dues shall be and remain permanently founded, the interest only to be used for current expenses.

Any Fellow not previously subject to Annual Dues who takes up his residence within fifty miles of Boston, shall pay to the Treasurer within three months thereafter Annual Dues for the current year, failing which his Fellowship shall cease; but the Council may suspend the provisions of this Article for a reasonable time.

Only Fellows who pay Annual Dues or have commuted them may hold office in the Academy or serve on the Standing Committees or vote at meetings.

ARTICLE 6. Fellows who pay or have commuted the Annual Dues and Foreign Honorary Members shall be entitled to receive gratis one copy of all Publications of the Academy issued after their election.

See Chap. xi, art. 2.

ARTICLE 7. Diplomas signed by the President and the Vice-President of the Class to which the member belongs, and countersigned by the Secretaries, shall be given to Foreign Honorary Members and to Fellows on request.

ARTICLE 8. If, in the opinion of a majority of the entire Council, any Fellow or Foreign Honorary Member shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his membership; and if three-fourths of the Fellows present, out of a total attendance of not less than fifty at a Stated Meeting, or at a Special Meeting called for the purpose, shall adopt this recommendation, his name shall be stricken from the Roll.

See Chap. iii; chap. vi, art. 1; chap. x, art. 1, 7; chap. xi, art. 2.

CHAPTER III.

ELECTION OF FELLOWS AND FOREIGN HONORARY MEMBERS.

The procedure in the election of Fellows and Foreign Honorary Members shall be as follows:

Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by Two Fellows of that Section, or by three Fellows of any Sections, and sent to the Corresponding Secretary accompanied by a statement of the qualifications of the nominee and brief biographical data.

Notice shall be sent to every Fellow not later than the fifteenth of January in each year, reminding him that all nominations must be in the hands of the Corresponding Secretary before the fifteenth of February following.

A list of the nominees, giving a brief account of each, with the names of the nominators, shall be sent to every Fellow with a request that he return the list with such confidential comments and indications of preference as he may choose to make.

All the nominations, with any comments thereon and with expressions of preference on the part of the Fellows, shall be referred to the appropriate Class Committees, which shall canvass them, and report their recommendations in writing to the Council before the Stated Meeting of the Academy in April.

Elections of Fellows and Foreign Honorary Members shall be made by the Council before the Annual Meeting in May, and announced at that meeting.

Persons nominated in any year, but not elected, may be carried over to the list of nominees for the next year at the discretion of the Council, but shall not be further continued unless renominated.

See Chap. ii; chap. vi, art. 1; chap. x, art. 1.

CHAPTER IV.

OFFICERS.

ARTICLE 1. The Officers of the Academy shall be a President (who shall be Chairman of the Council), four Vice-Presidents (one from each Class), a Corresponding Secretary (who shall be Secretary of the Council), a Recording Secretary, a Treasurer, a Librarian, and an Editor, all of whom shall be elected by ballot at the Annual Meeting, and shall hold their respective offices for one year, and until others are duly chosen and installed.

There shall be also sixteen Councillors, one from each Section of

each Class. At each Annual Meeting four Councillors, one from each Class, shall be elected by ballot to serve for the full term of four years and until others are duly chosen and installed. The same Fellow shall not be eligible for two successive terms.

The Councillors, with the other officers previously named, and the Chairman of the House Committee, *ex officio*, shall constitute the Council.

See Chap. xi, art. 1.

ARTICLE 2. If any officer be unable, through death, absence, or disability, to fulfill the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term.

ARTICLE 3. At the Stated Meeting in March, the President shall appoint a Nominating Committee of four Fellows having the right to vote, one from each Class. This Committee shall prepare a list of nominees for the several offices to be filled, and for the Standing Committees, and file it with the Recording Secretary not later than four weeks before the Annual Meeting.

See Chap. vi, art. 2.

ARTICLE 4. Independent nominations for any office, if signed by at least twenty Fellows having the right to vote, and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call therefor, and shall be mailed to all the Fellows having the right to vote.

See Chap. vi, art. 2.

ARTICLE 5. The Recording Secretary shall prepare for use in voting at the Annual Meeting a ballot containing the names of all persons duly nominated for office.

CHAPTER V.

THE PRESIDENT.

ARTICLE 1. The President, or in his absence the senior Vice-President present (seniority to be determined by length of continuous Fellowship in the Academy), shall preside at all meetings of the Acad-

emy. In the absence of all these officers, a Chairman of the meeting shall be chosen by ballot.

ARTICLE 2. Unless otherwise ordered, all Committees which are not elected by ballot shall be appointed by the presiding officer.

ARTICLE 3. Any deed or writing to which the Corporate Seal is to be affixed, except leases of real estate, shall be executed in the name of the Academy by the President or, in the event of his death, absence, or inability, by one of the Vice-Presidents, when thereto duly authorized.

See Chap. ii, art. 7; chap. iv, art. 1, 3; chap. vi, art. 2; chap. vii, art. 1; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1.

CHAPTER VI.

THE SECRETARIES.

ARTICLE 1. The Corresponding Secretary shall conduct the correspondence of the Academy and of the Council, recording or making an entry of all letters written in its name, and preserving for the files all official papers which may be received. At each meeting of the Council he shall present the communications addressed to the Academy which have been received since the previous meeting, and at the next meeting of the Academy he shall present such as the Council may determine.

He shall notify all persons who may be elected Fellows or Foreign Honorary Members, send to each a copy of the Statutes, and on their acceptance issue the proper Diploma. He shall also notify all meetings of the Council; and in case of the death, absence, or inability of the Recording Secretary he shall notify all meetings of the Academy.

Under the direction of the Council, he shall keep a List of the Fellows and Foreign Honorary Members, arranged in their several Classes and Sections. It shall be printed annually and issued as of the first day of July.

See Chap. ii, art. 7; chap. iii; chap. iv, art. 1; chap. x, art. 6; chap. xi, art. 1; chap. xii, art. 1.

ARTICLE 2. The Recording Secretary shall have the custody of the Charter, Corporate Seal, Archives, Statute-Book, Journals, and all literary papers belonging to the Academy.

Fellows borrowing such papers or documents shall receipt for them to their custodian.

The Recording Secretary shall attend the meetings of the Academy and keep a faithful record of the proceedings with the names of the Fellows present; and after each meeting is duly opened, he shall read the record of the preceding meeting.

He shall notify the meetings of the Academy to each Fellow and by mail at least seven days beforehand, and in his discretion may also cause the meetings to be advertised; he shall apprise Officers and Committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy.

After all elections, he shall insert in the Records the names of the Fellows by whom the successful nominees were proposed.

He shall send the Report of the Nominating Committee in print to every Fellow having the right to vote at least three weeks before the Annual Meeting.

See Chap. iv, art. 3.

In the absence of the President and of the Vice-Presidents he shall, if present, call the meeting to order, and preside until a Chairman is chosen.

See Chap. i; chap. ii, art. 7; chap. iv, art. 3, 4, 5; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1, 3.

ARTICLE 3. The Secretaries, with the Editor, shall have authority to publish such of the records of the meetings of the Academy as may seem to them likely to promote its interests.

CHAPTER VII.

THE TREASURER AND THE TREASURY.

ARTICLE 1. The Treasurer shall collect all money due or payable to the Academy, and all gifts and bequests made to it. He shall pay all bills due by the Academy, when approved by the proper officers, except those of the Treasurer's office, which may be paid without such approval; in the name of the Academy he shall sign all leases of real estate; and, with the written consent of a member of the Committee on Finance, he shall make all transfers of stocks, bonds, and other securities belonging to the Academy, all of which shall be in his official custody.

He shall keep a faithful account of all receipts and expenditures, submit his accounts annually to the Auditing Committee, and render them at the expiration of his term of office, or whenever required to do so by the Academy or the Council.

He shall keep separate accounts of the income of the Rumford Fund, and of all other special Funds, and of the Appropriation thereof, and render them annually.

His accounts shall always be open to the inspection of the Council.

ARTICLE 2. He shall report annually to the Council at its March meeting on the expected income of the various Funds and from all other sources during the ensuing financial year. He shall also report the names of all Fellows who may be then delinquent in the payment of their Annual Dues.

ARTICLE 3. He shall give such security for the trust reposed in him as the Academy may require.

ARTICLE 4. With the approval of a majority of the Committee on Finance, he may appoint an Assistant Treasurer to perform his duties, for whose acts, as such assistant, he shall be responsible; or, with like approval and responsibility, he may employ any Trust Company doing business in Boston as his agent for the same purpose, the compensation of such Assistant Treasurer or agent to be fixed by the Committee on Finance and paid from the Funds of the Academy.

ARTICLE 5. At the Annual Meeting he shall report in print all his official doings for the preceding year, stating the amount and condition of all the property of the Academy entrusted to him, and the character of the investments.

ARTICLE 6. The Financial Year of the Academy shall begin with the first day of April.

ARTICLE 7. No person or committee shall incur any debt or liability in the name of the Academy, unless in accordance with a previous vote and appropriation therefor by the Academy or the Council, or sell or otherwise dispose of any property of the Academy, except cash or invested funds, without previous consent and approval of the Council.

See Chap. ii, art. 4, 5; chap. vi, art. 2; chap. x, art. 6; chap. xi, art. 1, 2, 3; chap. xii, art. 1.

CHAPTER VIII.

THE LIBRARIAN AND THE LIBRARY.

ARTICLE 1. The Librarian shall have charge of the printed books, keep a correct catalogue thereof, and provide for their delivery from the Library.

At the Annual Meeting, as Chairman of the Committee on the Library, he shall make a Report on its condition.

ARTICLE 2. In conjunction with the Committee on the Library he shall have authority to expend such sums as may be appropriated by the Academy for the purchase of books, periodicals, etc., and for defraying other necessary expenses connected with the Library.

ARTICLE 3. All books procured from the income of the Rumford Fund or of other special Funds shall contain a book-plate expressing the fact.

ARTICLE 4. Books taken from the Library shall be receipted for to the Librarian or his assistant.

ARTICLE 5. Books shall be returned in good order, regard being had to necessary wear with good usage. If any book shall be lost or injured, the Fellow to whom it stands charged shall replace it by a new volume or by a new set, if it belongs to a set, or pay the current price thereof to the Librarian, whereupon the remainder of the set, if any, shall be delivered to the Fellow so paying, unless such remainder be valuable by reason of association.

ARTICLE 6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

ARTICLE 7. The Librarian shall have the custody of the Publications of the Academy. With the advice and consent of the President, he may effect exchanges with other associations.

See Chap. ii, art. 6; chap. xi, art. 1, 2.

CHAPTER IX.

THE EDITOR AND THE PUBLICATIONS.

ARTICLE 1. The Editor shall have charge of the conduct through the press of the Proceedings and the Memoirs, and all correspondence

relative thereto, and shall have power to fix the price at which individual numbers of the Proceedings and Memoirs are sold.

ARTICLE 2. In conjunction with the Committee of Publication, he shall have authority to expend such sums as may be appropriated by the Academy for printing the publications and for defraying other expenses therewith connected.

ARTICLE 3. All publications which are financed in whole or in part from the income of the Rumford Fund or from the income of other special funds, and all publications of work done with the aid of the Rumford Fund or other special funds, shall contain a conspicuous statement of this fact.

ARTICLE 4. Two hundred extra copies of each paper printed in the Proceedings or Memoirs shall be placed at the disposal of the author without charge.

If, on account of the number of communications offered for publication, it shall be necessary to decline for publication communications otherwise acceptable, members of the Academy shall be given preference in each of the several Classes over non-members; but whenever it shall be necessary to exercise this preference, the Editor shall inform the Council of the fact.

See Chap. iv, art. 1; chap. vi, art. 3; chap. x, art. 6; chap. xi, art. 4.

CHAPTER X.

THE COUNCIL.

ARTICLE 1. The Council shall exercise a discreet supervision over all nominations and elections to membership, and in general supervise all the affairs of the Academy not explicitly reserved to the Academy as a whole or entrusted by it or by the Statutes to standing or special committees.

It shall consider all nominations duly sent to it by any Class Committee, and act upon them in accordance with the provisions of Chapter III.

With the consent of the Fellow interested, it shall have power to make transfers between the several Sections, reporting its action to the Academy.

See Chap. iii, art. 2, 3; chap. xi, art. 1.

ARTICLE 2. Nine members shall constitute a quorum.

ARTICLE 3. It shall establish rules and regulations for the transaction of its business, and provide all printed and engraved blanks and books of record.

ARTICLE 4. It shall act upon all resignations of officers, and all resignations and forfeitures of Fellowship; and cause the Statutes to be faithfully executed.

It shall appoint all agents and subordinates not otherwise provided for by the Statutes, prescribe their duties, and fix their compensation. They shall hold their respective positions during the pleasure of the Council.

ARTICLE 5. It may appoint, for terms not exceeding one year, and prescribe the functions of, such committees of its number, or of the Fellows of the Academy, as it may deem expedient, to facilitate the administration of the affairs of the Academy or to promote its interests.

ARTICLE 6. At its March meeting it shall receive reports from the President, the Secretaries, the Treasurer, and the Standing Committees, on the appropriations severally needed for the ensuing financial year. At the same meeting the Treasurer shall report on the expected income of the various Funds and from all other sources during the same year.

A report from the Council shall be submitted to the Academy, for action, at the March meeting, recommending the appropriation which in the opinion of the Council should be made.

On the recommendation of the Council, special appropriations may be made at any Stated Meeting of the Academy, or at a Special Meeting called for the purpose.

See Chap. xi, art. 3.

ARTICLE 7. After the death of a Fellow or Foreign Honorary Member, it shall appoint a member of the Academy to provide a biographical notice for publication in the Proceedings.

ARTICLE 8. It shall report at every meeting of the Academy such business as it may deem advisable to present.

See Chap. ii, art. 4, 5, 8; chap. iv, art. 1, 2; chap. vi, art. 1; chap. vii, art. 1; chap. xii, art. 1, 4.

CHAPTER XI.

STANDING COMMITTEES.

ARTICLE 1. The Class Committee of each Class shall consist of the Vice-President, who shall be chairman, and the four Councillors of the Class, together with such other officer or officers annually elected as may belong to the Class. It shall consider nominations to Fellowship in its own Class, and report in writing to the Council such as may receive at a Class Committee Meeting a majority of the votes cast, provided at least three shall have been in the affirmative.

See Chap. iii, art. 2.

ARTICLE 2. At the Annual Meeting the following Standing Committees shall be elected by ballot to serve for the ensuing year:

(i) *The Committee on Finance*, to consist of four Fellows, who, through the Treasurer, shall have full control and management of the funds and trusts of the Academy, with the power of investing the funds and changing the investments thereof in their discretion.

See Chap. iv, art. 3; chap. vii, art. 1, 4; chap. x, art. 6.

(ii) *The Rumford Committee*, to consist of seven Fellows, who shall report to the Academy on all applications and claims for the Rumford Premium. It alone shall authorize the purchase of books, publications and apparatus at the charge of the income from the Rumford Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iii) *The Cyrus Moors Warren Committee*, to consist of seven Fellows, who shall consider all applications for appropriations from the income of the Cyrus Moors Warren Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iv) *The Committee of Publication*, to consist of the Editor, *ex officio*, as Chairman, and four other Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Proceedings and the Memoirs shall be entrusted.

It shall fix the price at which volumes of the publications shall be sold; but Fellows may be supplied at half price with volumes which they are not entitled to receive gratis.

It shall determine when the pressure of material offered for publication makes it necessary to give preference to members of the Academy as compared with non-members, or to give priority to certain members as compared with others, and to what extent this preference or priority shall be applied in each of the four Classes, to the end that a proper balance of the facilities of publication with respect to subject matter and authors may be maintained.

See Chap. iv, art. 3; chap. vi, art. 1, 3; chap. ix; chap. x, art. 6.

(v) *The Committee on the Library*, to consist of the Librarian, *ex officio*, as Chairman, and four other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management.

See Chap. iv, art. 3; chap. viii, art. 1, 2; chap. x, art. 6.

(vi) *The House Committee*, to consist of four Fellows, who shall have charge of all expenses connected with the House, including the general expenses of the Academy not specifically assigned to the care of other Committees or Officers.

See Chap. iv, art. 1, 3; chap. x, art. 6.

(vii) *The Committee on Meetings*, to consist of the President, the Recording Secretary, and four other Fellows, who shall have charge of plans for meetings of the Academy.

See Chap. iv, art. 3; chap. x, art. 6.

(viii) *The Auditing Committee*, to consist of two Fellows, who shall audit the accounts of the Treasurer, with power to employ an expert and to approve his bill.

See Chap. iv, art. 3; chap. vii, art. 1; chap. x, art. 6.

(ix) *The Committee on Biographical Notices*, to consist of six Fellows, two to be elected each year, six in 1933, one of them to be a Secretary of the Academy, to see that biographical notices of the Fellows are provided.

See Chap. x, art. 7.

ARTICLE 3. The Standing Committees shall report annually to the Council in March on the appropriations severally needed for the ensuing financial year; and all bills incurred on account of these Committees, within the limits of the several appropriations made by the Academy, shall be approved by their respective Chairmen.

In the absence of the Chairman of any Committee, bills may be approved by any member of the Committee whom he shall designate for the purpose.

See Chap. vii. art. 1, 7; chap. x, art. 6.

CHAPTER XII.

MEETINGS, COMMUNICATIONS, AND AMENDMENTS.

ARTICLE 1. There shall be annually eight Stated Meetings of the Academy, namely, on the second Wednesday of October, November, December, January, February, March, April, and May. Only at these meetings, or at adjournments thereof regularly notified, or at Special Meetings called for the purpose, shall appropriations of money be made or amendments of the Statutes or Standing Votes be effected.

The Stated Meeting in May shall be the Annual Meeting of the Corporation.

Special Meetings shall be called by either of the Secretaries at the request of the President, of a Vice-President, of the Council, or of ten Fellows having the right to vote; and notifications thereof shall state the purpose for which the meeting is called.

A meeting for receiving and discussing literary or scientific communications may be held on the fourth Wednesday of each month, excepting July, August, and September; but no business shall be transacted at said meetings.

ARTICLE 2. Twenty-five Fellows having the right to vote shall constitute a quorum for the transaction of business at Stated or Special Meetings. Eighteen Fellows shall be sufficient to constitute a meeting for literary or scientific communications and discussions.

ARTICLE 3. Upon the request of the presiding officer or the Recording Secretary, any motion or resolution offered at any meeting shall be submitted in writing.

ARTICLE 4. No report of any paper presented at a meeting of the Academy shall be published by any Fellow without the consent of the author; and no report shall in any case be published by any Fellow in a newspaper as an account of the proceedings of the Academy without the previous consent and approval of the Council. The Council, in its discretion, by a duly recorded vote, may delegate its authority in this regard to one or more of its members.

ARTICLE 5. No Fellow shall introduce a guest at any meeting of the Academy until after the business has been transacted, and especially until after the result of the balloting upon nominations has been declared.

ARTICLE 6. The Academy shall not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its Publications.

ARTICLE 7. All proposed Amendments of the Statutes shall be referred to a committee, and on its report, at a subsequent Stated Meeting or at a Special Meeting called for the purpose, two-thirds of the ballot cast, and not less than twenty-five, must be affirmative to effect enactment.

ARTICLE 8. Standing Votes may be passed, amended, or rescinded at a Stated Meeting, or at a Special Meeting called for the purpose, by a vote of two-thirds of the members present. They may be suspended by a unanimous vote.

See Chap. ii, art. 5, 8; chap. iii; chap. iv, art. 3, 4, 5; chap. v, art. 1; chap. vi, art. 1, 2; chap. x, art. 8.

STANDING VOTES.

1. Communications of which notice has been given to either of the Secretaries shall take precedence of those not so notified.

2. Fellows may take from the Library six volumes at any one time, and may retain them for three months, and no longer. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

3. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy without the leave of the Librarian.

4. The Council, under such rules respecting nominations as it may prescribe, may elect as Associates of the Academy a limited number of men of mark in affairs or of distinguished service in the community.

Associates shall be entitled to the same privileges as Fellows, but shall not have the right to vote.

The admission fee and annual dues of Associates shall be the same as those of Fellows residing within fifty miles of Boston.

5. Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication.

RUMFORD PREMIUM.

In conformity with the terms of the gift of Sir Benjamin Thompson, Count Rumford, of a certain Fund to the American Academy of Arts and Sciences, and with a decree of the Supreme Judicial Court of Massachusetts for carrying into effect the general charitable intent and purpose of Count Rumford, as expressed in his letter of gift, the Academy is empowered to make from the income of the Rumford Fund, as it now exists, at any Annual Meeting, an award of a gold and a silver medal, being together of the intrinsic value of three hundred dollars, as a Premium to the author of any important discovery or useful improvement in light or heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American islands; preference always being given to such discoveries as, in the opinion of the Academy, shall tend most to promote the good of mankind; and, if the Academy sees fit, to add to such medals, as a further Premium for such discovery and improvement, a sum of money not exceeding three hundred dollars.

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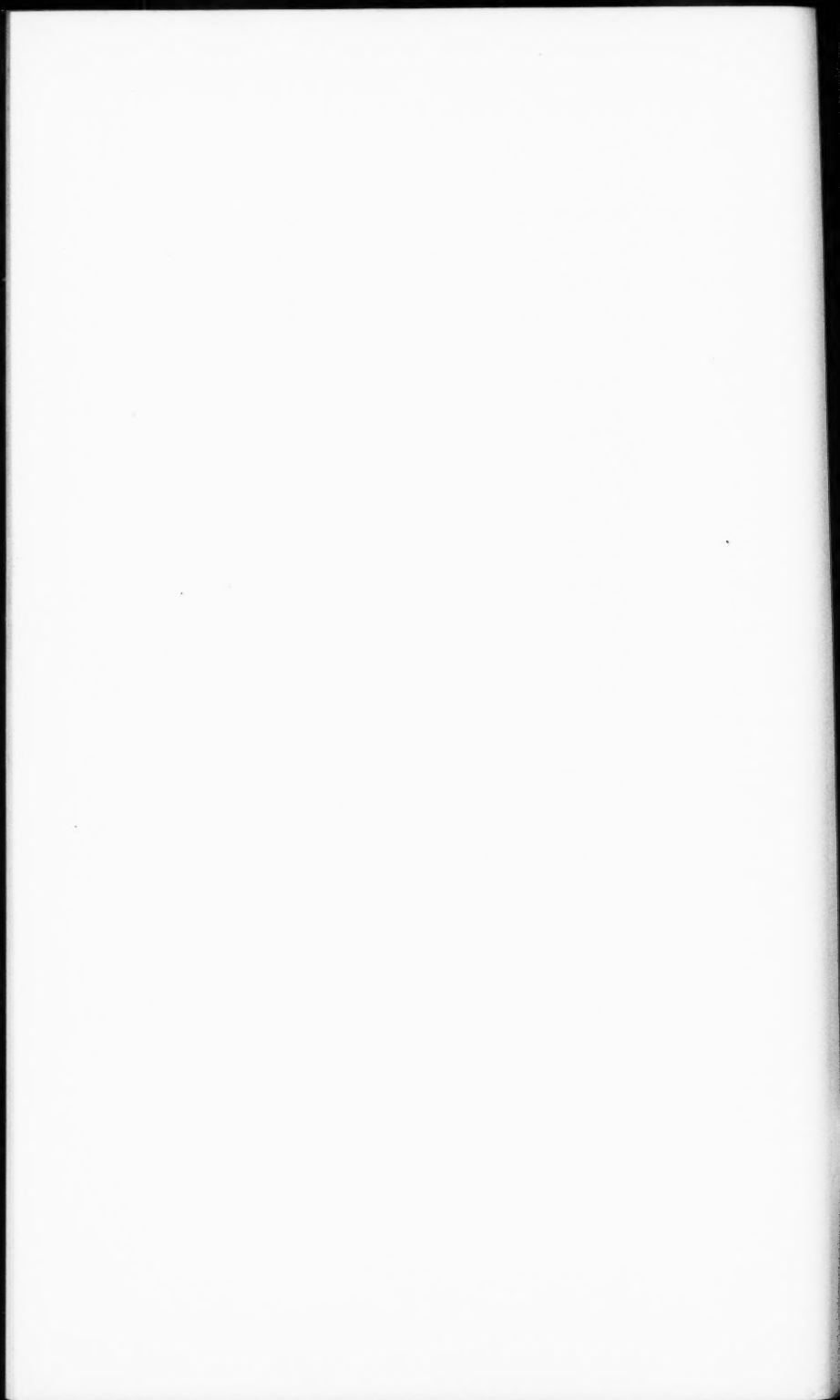
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